

Early Preschool Environments and Gender: Effects of Gender Pedagogy in Sweden

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Abstract

To test how early social environments affect children's consideration of gender, 3–6-year-old children ($N = 80$) enrolled in gender-neutral or typical preschool programs in the central district of a large Swedish city completed measures designed to assess their gender-based social preferences, stereotypes, and automatic encoding. Compared with children in typical preschools, a greater proportion of children in the gender-neutral school were interested in playing with unfamiliar other-gender children. Additionally, children attending the gender-neutral preschool scored lower on a gender stereotyping measure than children attending typical preschools. Children at the gender-neutral school were not less likely to automatically encode others' gender, however. The findings suggest that gender-neutral pedagogy has moderate effects on how children think and feel about people of different genders, but may not affect children's tendency to spontaneously notice gender.

Keywords: Children, Gender, Attitudes, Stereotypes, Encoding, Socialization

Early Social Environments and Gender: Effects of Gender Pedagogy in Swedish Preschools

Children are attuned to gender from an early age: infants in the United States can discriminate between male and female faces in looking-time studies (Quinn et al., 2011) and look longer at faces that match the gender of their primary caregiver (Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002). Additionally, most U.S. children can label their own and others' gender by the time they are two years old (Weinraub et al., 1984; Zosuls, Ruble, Tamis-LeMonda, Shrout, Bornstein, & Greulich, 2009). Young children not only perceive gender, but they also use gender to guide their social preferences and inferences about others (Dunham, Baron, & Banaji, 2016; Martin & Halverson, 1981). Preschool-age children in the U.S. show gender ingroup favoritism (Maccoby & Jacklin, 1987; Martin, Fabes, Evans & Wyman, 1999; Shutts & Renno, 2015; Shutts, Roben, & Spelke, 2013) and hold gender-based beliefs about others' attributes (e.g., that boys like trucks and girls like dolls; Bauer & Coyne, 1997; Kuhn, Nash, & Brucken, 1978; Martin, 1989). Although much of the research on children's consideration of gender has been conducted in the U.S., studies reveal that young children in other cultures also categorize people by gender, prefer members of their own gender, and hold gender stereotypes (e.g., Brazil: de Guzman, Carlo, Ontai, Koller, & Knight, 2004; China: Knobloch, Callison, Chen, Fritzsche, & Zillmann, 2005; South Africa: Albert & Porter, 1986 and Muthukrishna & Sokoya, 2008; South Wales: Yee & Brown, 1994)

While the prominence of gender in young children's minds is well established (see Ruble, Martin, & Berenbaum, 2006, for a thorough review), the reason for the category's preeminence is less clear (Martin, Ruble, & Szkrybalo, 2002). Some researchers have posited that gender is prominent because humans have an evolved, specialized system dedicated to classifying and reasoning about others based on their gender (e.g., Cosmides, Tooby, & Kurzban, 2003; see

Shutts, 2013, for discussion). An alternative proposition in the field is that children focus on gender because their social environments highlight the importance of the category. For example, both Gender Schema Theory (Bem, 1981; 1983) and Developmental Intergroup Theory (Arthur, Bigler, Liben, Gelman, & Ruble, 2008; Bigler & Liben, 2007) emphasize that children receive significant input—from parents, teachers, and media—about gender categories and roles. Indeed, studies show that, at least in the U.S., adults regularly use nouns and pronouns to mark gender when talking to children (Gelman, Taylor, & Nguyen, 2004; see Waxman, 2010, for discussion). Moreover, teachers sometimes use gender to organize their classrooms (e.g., asking children to alternate by gender in seating; Bigler & Liben 2007). Such practices may contribute to, or fully account for, children’s early and robust reliance on gender as a social category.

It is difficult to determine the role of social experience in guiding children’s reliance on gender categories because many young children spend significant periods of time in social environments where gender is emphasized—including preschools. Nevertheless, there are a small number of preschools that are committed to the practice of “gender-neutral” classroom environments in which teachers typically refrain from using gendered language, and actively work to counteract gender stereotypes. Studying children who experience gender-neutral pedagogy (vs. more typical instruction) provides an unusual opportunity to examine the role of teachers’ behaviors in guiding children’s consideration of gender distinctions. The present research examined whether and how such schooling might affect children’s reliance on gender information across a range of measures.

In addition to shedding light on the theoretical proposition that adults’ behavior plays a key role in children’s consideration of gender, research on gender-neutral pedagogy makes a practical contribution. Many have noted the negative effects of social exclusion, gender

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4 stereotyping, and unequal treatment on young children’s development (e.g., Andrews, Martin,
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7 Gield, Cook, & Lee, 2016; Bian, Leslie, & Cimpian, 2007; Halpern et al., 2011) – and gender-
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9 neutral pedagogy seeks to address such social problems through de-emphasizing gender
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11 distinctions. Further, gender-neutral pedagogy is of great international interest: For example,
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13 the first 20 results from a recent (February 2017) Google internet search for “Swedish gender
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15 neutral preschools” included relevant articles from the *New York Times*, *Washington Post*,
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17 *Newsweek*, the *Guardian*, *Daily Mail*, *Independent*, and the BBC (all published since 2010). Yet
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19 we are not aware of any research comparing children who attend gender-neutral preschools to
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21 those who attend more typical schools. Such research is needed, as it bears on whether gender-
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23 neutral practices (which are effortful, and require extensive teacher training) can affect children’s
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25 perceptions, feelings, and thoughts about gender.
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31 **Previous Research on Gender Pedagogy in Schools**

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33 Two studies have examined how highlighting gender categories in classrooms affects
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35 children’s gender attitudes and stereotyping. In one experiment (Bigler, 1995), 6- to 11-year-old
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37 children in the U.S. were randomly assigned to classrooms that differed in the emphasis teachers
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39 placed on gender over the course of four weeks. Teachers in the experimental classrooms
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41 frequently used gender noun labels to refer to students (e.g., “All the girls should be sitting
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43 down”; “Jack, be a good helper for the boys”) and designed classroom materials and activities
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45 that highlighted gender (e.g., a bulletin board with girls’ art on one side and boys’ art on the
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47 other; desks placed such that all the boys sat on one side of the room and all the girls sat on the
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49 other). Teachers in control classrooms treated their class as a unit and referred to students by
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51 their individual names only. Following the intervention, children in the experimental classrooms
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53 showed higher levels of gender stereotyping, but showed similar levels of gender in-group
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4 favoritism to children in control classrooms. As Bigler (1995) noted, however, the gender in-
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7 group favoritism measures showed little variance, and most children were at ceiling. Thus, these
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10 measures may not have been sensitive enough to capture the effects of the intervention on
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12 children's social preferences.

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14 A second, more recent experiment in the U.S. (Hilliard & Liben, 2010) also manipulated
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16 the salience of gender categories for children—this time in a preschool setting. Over the course
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18 of two weeks, 3- to 5-year-old participants in a “high-salience” condition were exposed to
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20 classroom conditions similar to those implemented in Bigler’s (1995) experimental classrooms.
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22 Participants in “low-salience” classrooms experienced their usual classroom conditions, which
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24 were guided by school-level policies discouraging the use of gendered language or gendered
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26 classroom organization. From pre-test to post-test, children in the high-salience condition
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28 showed increased gender stereotyping, less positive ratings of other-gender peers, and reduced
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30 play with other-gender peers; children in the low-salience condition showed none of these
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32 effects. These findings, together with the gender stereotyping effects reported by Bigler (1995),
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34 are consistent with Developmental Intergroup Theory (Bigler & Liben, 2007), which posits that
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36 when adults highlight a social distinction (e.g., through labeling and function use), it causes
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38 children to treat the highlighted distinction as a psychologically meaningful one.
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46 Teachers in the experimental classrooms of Bigler’s (1995) and Hilliard and Liben’s
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48 (2010) research were asked to go to great lengths to make gender salient. Further, children in the
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50 experimental conditions experienced a dramatic and sudden change of classroom practices.
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52 Although the condition differences in both studies show that extreme gender-highlighting
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54 practices intensify children’s gender attitudes and stereotypes, the research cannot tell us whether
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56 subtler, long-term differences in pedagogy—of the sort that distinguish practices in typical
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classrooms from practices in gender-neutral programs—affect how young children view gender. The answer to this question not only addresses the potency of gender socialization effects, but also contributes to our understanding of whether promoting gender-neutral preschool environments is a meaningful practice in early childhood.

The Present Research

Cultural context and school settings. The present research focused on 3- to 6-year-old children in Sweden, a society with relatively egalitarian gender attitudes. Across the past 5 years (2011-2016), the World Economic Forum’s gender gap index, for example, has consistently rated Sweden as the fourth most gender-equal society in the world based on the areas of economics, politics, education, and health. For comparison, the U.S. has ranged from 20th to 45th with a median rank of 23rd. Participants came from two kinds of preschool settings: some participants attended a preschool with several specific school policies and practices aimed at actively creating a gender-neutral environment, while other participants attended more typical Swedish preschools. Throughout this paper, we refer to the former schooling environment as "gender-neutral" (GN) and the latter environment as "typical", for ease of exposition. It is important to note, however, that all Swedish schools are required by law to aim for gender equality in classrooms, and thus the difference in gender-neutrality between the GN and typical settings in the present research was a matter of degree rather than absolute. For reviews of the almost entirely qualitative and sociological literature discussing issues of gender in Swedish schools, see Edström (2009), Heikkilä (2011), Wahlström (2003), and Wernersson (2009).

The government-mandated national curriculum for preschools in Sweden asserts that classroom practices affect preschoolers’ understanding of gender, and prescribes that “girls and boys in preschools should have the same opportunities to test and develop abilities and interests

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4 outside the limitations of stereotyped gender roles” and that “preschools should counteract
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6 traditional gender roles and gender patterns” (Skolverket, 2011, p.5). In practice, however, there
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8 is a great deal of variation in the implementation of government guidelines across preschools
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10 (Eidevald, 2009); even preschool teachers who intend to treat boys and girls in the same way are
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12 not always successful because treating boys and girls differently can be an unconscious habit
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14 (Odenbring, 2010; Wahlström, 2003). This is one reason why a small number of Swedish
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16 preschools have taken a further step of undergoing certification offered by the Swedish
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18 Federation for Lesbian, Gay, Bisexual and Transgender Rights (RFSL). To achieve RFSL
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20 certification, all personnel undergo comprehensive training (certification takes six to eight
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22 months) in treating all individuals according to their individual requirements, regardless of
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24 gender or sexual orientation.
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31 In the current study, the GN preschool but not the typical preschools pursued and attained
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33 RFSL certification, which can therefore be taken as an independent confirmation of differences
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35 in gender pedagogy between the schools. The specific policies of the GN school included
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37 avoiding gendered language as much as possible (for example, by using the recently-adopted
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39 Swedish gender-neutral pronoun, and not saying “boy” or “girl”), modifying stories and songs to
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41 counteract rather than reinforce traditional gender-roles and family structures, and avoiding some
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43 behaviors traditionally directed at one gender (e.g., commenting on the attractiveness of girls’
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45 clothes). The Appendix presents information about the self-reported gender practices (and
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47 beliefs) of teachers at the GN and typical preschools in the present research.
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53 **Overview of measures and hypotheses.** We tested for potential effects of gender-
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55 neutral pedagogy by presenting children at the GN and typical schools with a series of measures.
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57 Participants first completed a task designed to assess their automatic encoding of other people’s
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gender. Then, participants completed tasks meant to probe their gender attitudes and gender stereotyping. All tasks were chosen because of past research demonstrating their utility in measuring children's emerging consideration of gender in the preschool years (e.g., LaFreniere, Strayer & Gauthier, 1984; Leinbach, Hort, & Fagot, 1997; Shutts et al., 2013; Weisman, Johnson, & Shutts, 2015), thus allowing us to explore possible decreased consideration of gender among children in the GN school. At the end of the session, we also tested children's ability to identify the gender of target stimuli from the tasks. The purpose of the identification task was to validate the stimuli and assess whether there were any differences between GN and typical school children's ability to identify other people's gender (which could be a confound in the study). As our primary comparison of interest was across groups (i.e., typical vs. GN schooling), we chose to use a fixed task order so as not to increase within-group variance, which would reduce our power to detect between-group effects. The order of tasks—except for the position of the identification task—was arbitrary. The identification task was presented at the end of the session so that our use of gender labels would not cause any child to consider gender on the other tasks when they otherwise might not have.

Consistent with the tenets of Developmental Intergroup Theory (Bigler & Liben, 2007), we hypothesized that children attending the GN school—where teachers de-emphasize the importance of gender—would view gender as a less psychologically meaningful distinction than children in typical schools. Accordingly, we predicted that children at the GN school would be less likely to take automatically note of an individual's gender (encoding task), less likely to use gender when deciding whether to play with another individual (social partner preference tasks), and less likely to use gender when reasoning about another person's attributes (stereotyping task). Put another way, because adults in their environment do not emphasize that gender is a

relevant dimension to consider, we predicted that children at the GN school would be less likely to consider other people's gender. Yet another reason to posit that children at the GN school would be less likely to use gender to reason about another person's attributes (stereotyping task) is that teachers at the GN school report working to actively counter gender stereotypes (see the Appendix); thus, children at the GN school likely have less access to information about gender stereotypes (which should result in lower scores on the stereotyping task).

Method

Participants

Participants were recruited from four preschools (one GN and three typical) located in the central district of a large Swedish city. All the typical schools were within 1.4 km of the GN school. Participants came from three different classrooms at the GN school, and from five different typical classrooms. All families with children in available classrooms (determined by the schools) received a letter inviting them to participate; parents who were interested gave written informed consent. There were 30 participants from the GN school and 50 participants from typical schools. Three additional children were excluded from participation because of insufficient Swedish language skills or developmental disorders.

Parents provided information about their child's age and gender on the consent form. Participants from the GN and typical schools were closely matched on these dimensions (see Table 1). The majority of families (69%) also returned an optional questionnaire that included items focused on family characteristics (e.g., parental age and education level). As displayed in Table 1, participants in the GN and typical schools came from families with similar characteristics. The questionnaire also asked parents to indicate why they had chosen their child's school in order to determine whether parents of children attending the GN school were

specifically attracted to gender-neutral pedagogy. The question was, “Why did you choose the school that your child attends?” and parents could select as many options as they wanted from the following list: (a) close to home, (b) recommended by others, (c) gender-neutral pedagogy, (d) another sibling already attends, (e) assigned to the school, or (f) other reasons. The two most common response given by parents at both schools were (a) and (b). Five families from the GN school and one family from a typical school chose (c) as one of their responses.

On average, children at the GN school had been attending for 2.2 years ($SD = 1.4$ years, $Range = 0.5$ to 5.2 years) and years attending was highly correlated with age (Pearson’s $r = 0.731$, $t(28) = 5.665$, $p < .001$). We did not collect data on when participants began attending the typical schools, but there is no reason to believe it would be significantly different from the GN school. All four schools accept children from 12 months of age; further, 84% of 1- to 5-year-olds and 95% of 3- to 5-year-olds in Sweden attend preschool (Skolverket, 2014).

-- Insert Table 1 about here --

Materials and Procedure

One of two female experimenters tested each participant individually in a quiet room at their school. The tasks were presented to children in the order they are described below. The following was true of stimuli in all the tasks except for the familiar playmate preference measure: the tasks included color photographs of real children who were not familiar to participants; the photographs were obtained from internet image searches and stock photography websites (and are available from the authors, upon request); the children in the photographs were visible from the shoulders up and were wearing gender-neutral clothing (grey or white t-shirts); and photographs within a pair were matched for attractiveness, ethnicity (all were White), and expression (all positive). Gender was marked by hair length (short for boys, long for girls) in all

four tasks (except for the androgynous photographs; see below), but it was further marked by the provision of gender-informative proper names in the unfamiliar playmate, stereotyping, and identification tasks. Swedish wording for all measures is available from the authors upon request.

Gender encoding. To measure children’s automatic encoding of gender, we presented participants with a memory confusion task (Bennett & Sani, 2003; Cosmides, Tooby, & Kurzban, 2003; Taylor, Fiske, Etcoff, & Ruderman, 1978; Weisman et al., 2015). This task has previously shown that automatic encoding of gender is evident by at least 4 years of age in U.S. preschoolers (Weisman et al., 2015). In the task, participants saw four different target children (two boys, two girls) and 16 different animal pictures. Each of four blocks in the task consisted of a familiarization phase followed by a test phase. During familiarization, participants saw four different child-animal pairings, one at a time. For each pairing (8 s total presentation time), participants saw a target child, heard what animal the child had seen (e.g., “This kid saw the horse”), and saw a picture of the animal. At test, participants were asked to match the four animals’ pictures with the four targets by placing the pictures next to each other. The order in which the target photos were presented and the pairing of targets with animals were counter-balanced across participants.

For each participant, we counted the number of within-category errors (i.e., errors where the participant paired an animal with a child who matched the gender of the correct target) and the number of between-category errors (i.e., errors where the participants paired an animal with a child who did not match the gender of the correct target). We then divided the total number of between-category errors by two (to account for the fact that between-category errors are twice as likely to occur by chance as within-category errors in this task; see Taylor et al., 1978 and

Weisman et al., 2015), and subtracted the resulting number from the total number of within-category errors. This procedure generated a difference score indicating how much more likely children were to make a mistake within a gender than across genders. Scores significantly above zero indicate gender encoding.

Social partner preferences: Unfamiliar playmates. One social preference task focused on children's preferences for unfamiliar children, following on a method which has previously shown that same-gender social preferences are apparent in children as young as 3 years of age in the U.S. (see Abel & Sahinkaya, 1962 and Shutts et al., 2013). Participants saw 14 unique pairs of photographs. Eight pairs featured a boy and a girl, one pair featured two boys, and one pair featured two girls. An additional four pairs included an androgynous boy or girl (with medium-length hair, but a traditional, gendered name) alongside a child of the same gender with typical hair length (and a traditional, gendered name).

On each of the 14 trials, the experimenter presented the two photographs, provided a name for each child, and asked the participant, "Which child would you like to play with? You can choose [e.g.] Miranda, Dennis, or both of them." The different pair types were interspersed throughout the task, and presented in the same order to all participants. The boy appeared on the left for half of boy-girl trials, and the androgynous child appeared on the left for half of the androgynous trials.

Pairs with two children of the same gender were included at the request of GN teachers (to minimize the implication that gender is the most relevant feature guiding playmate selection); participants' playmate selections on these trials did not contribute to the task score and were not analyzed. Pairs with an androgynous child were also included at the request of GN teachers (so as not to imply that boys and girls must have short and long hair, respectively). We had planned

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4 to test whether children in the different school settings might differ in their willingness to
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6 befriend androgynous children, but participants' performance on the gender identification task
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8 (described later in this section) revealed they had difficulty identifying androgynous children's
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10 gender. For this reason, children's playmate choices for the four pairs that included an
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12 androgynous target were not considered in the task score or analyses.
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16 For the boy-girl trials, each same-gender choice was scored as "1", each other-gender
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18 choice was scored as "0", and each response of "both" was scored as ".5". Individual trial scores
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20 were summed and divided by the total number of trials completed to generate a task score for
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22 each participant. Scores above .5 indicate gender in-group favoritism, while scores below .5
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24 indicate gender out-group favoritism.
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28 **Social partner preferences: Familiar playmates.** A second social preference task
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30 assessed participants' preferred play partners at school. Naturalistic observations of children
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32 indicate same-gender play partner preferences emerge around 2 years of age for girls and 3 years
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34 of age for boys in Canada (LaFreniere, Strayer & Gauthier, 1984). Additionally, children have
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36 also been shown to be able to reliably and validly nominate their preferred playmates at 3-5 years
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38 of age (see Gershman & Hayes, 1983; Peterson & Siegal, 2002). In the current task, the
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40 experimenter presented a photograph of the participant's class and asked, "Are there any children
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42 here you usually play with?", continuing to prompt if necessary until the participant identified
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44 three children. We recorded the number of same-gender playmates choices (out of the three).
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49 **Stereotyping.** The stereotyping task measured participants' thoughts about other
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51 children's behavioral propensities—in particular the degree to which participants' beliefs
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53 matched cultural norms about what boys and girls like to do. Previous research indicates that
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55 such stereotypes are evident by around 3 years of age in U.S. children (see Baker, Tisak, &
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4 Tisak, 2016; Blakemore, 2003; Kuhn, Nash, & Brucken, 1978; Leinbach, Hort, & Fagot, 1997;
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6 Malcolm, Defeyter, & Friedman, 2014; Martin & Little, 1990). In the current task, participants
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8 saw 8 different trials (two with toy cars; two with toy dolls; two with a child's pair of jeans and a
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10 masculine, collared shirt; and two with a child's dress). At the start of each trial, the
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12 experimenter showed the participant a toy or outfit on a computer screen and provided a
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14 description (e.g., "This is a toy car"). After this, a photograph of a boy and a photograph of a
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16 girl appeared onscreen (equidistant from the toy or outfit). The experimenter said, "This is [e.g.]
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18 Tim and this is Ellie. Which child do you think most wants to [e.g.] play with the car, Tim, Ellie,
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20 or both equally?" Participants saw one of four pseudo-randomized orders that differed in object
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22 order (but not photograph pair order). The photograph of the girl appeared on the left for half of
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24 trials within the task. Responses in line with cultural stereotypes (i.e., girls like dolls and
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26 dresses; boys like trucks and jeans/shirts) were scored as "1", while responses counter to cultural
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28 stereotypes (i.e., girls like trucks and jeans/shirts; boys like dolls and dresses) were scored as
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30 "0". Responses of "both" were scored as ".5" since they were neither in line with, nor counter
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32 to, cultural stereotypes. Individual trial scores were summed and divided by the total number of
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34 trials completed to generate a task score for each participant. Task scores above .5 indicate a
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36 pattern in line with cultural stereotypes, while scores below .5 indicate a pattern counter to
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38 cultural stereotypes.

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48 **Gender identification.** Each participant saw 10 pairs of photographs taken from the
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50 unfamiliar playmate preference task and stereotyping task. All participants saw four boy-girl
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52 pairs, four pairs with an androgynous child alongside a child of the same gender (with traditional
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54 hair), one boy-boy pair, and one girl-girl pair. On each trial, the experimenter presented the pair
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56 of photographs and accompanying names, and asked, for each photograph in the pair, "Do you
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think the child is called a girl or a boy?” The different pair types were interspersed throughout the task, and were presented to participants in one of four pseudo-randomized orders. Across the orders, we varied which boy-girl pairs were presented, in order to ensure that all pairs used in the tasks were seen by some participants. The boy appeared on the left for half of boy-girl trials, and the androgynous child appeared on the left for half of the androgynous trials. Participants received a “1” for each correct response and a “0” for each incorrect response. Individual trial scores were summed and divided by the total number of trials completed to generate a task score for each participant. For androgynous faces, “correct” was defined as providing a gender label that matched the gender of the target child’s proper name. However, participants had difficulty identifying the gender of androgynous children (who had medium-length hair and gender-informative proper names; $M = .712$, $SD = .281$). For this reason, we excluded trials featuring androgynous children from all further analyses.

Results

Data Analysis and Presentation Strategy

The majority of analyses probing for effects of school types were carried out using Generalized Linear Regression Models, which analyze data in the same way as ANOVA. We used the factors of school type, gender, age, and their interactions. The interactions were included to examine if GN pedagogy affects girls and boys or children of different ages differently. For each task, we also present descriptive information about performance by children at the GN and typical schools (see Table 2) and statistics comparing children’s performance to chance. We provide effects sizes as well as 95% confidence intervals for these effects sizes wherever appropriate.

-- insert Table 2 about here --

For each task, analyses focused on the full sample of GN and typical school children are presented first, followed by analyses focused on a more restricted sample. The restricted sample analyses address two potential sources of bias: First, as noted earlier, five families from the GN school (and one family from a typical school) selected gender-neutral education as a reason for choosing their child's school. One possibility is that parents who desire gender-neutral education for their children differ from parents who do not have that desire (e.g., such parents may practice more gender-neutral rearing practices at home). Second, some children in our sample were not very successful in identifying others' gender—and this ability is a prerequisite for gender-based responding in the other tasks. For example, in order to express a preference for same-gender individuals in the unfamiliar playmates task, one must be able to identify which individuals are girls and which are boys.

To address both confounds and probe the robustness of our school type effects, we re-ran all analyses for tasks where we found significant or marginally significant school type difference in the analyses focused on the full sample. For these new analyses, we excluded participants whose parents selected gender-neutral education as a reason for their school choice ($N = 1$ from a typical school and $N = 5$ from the GN school) as well as participants who scored less than 75% on the gender identification task ($N = 3$ from typical schools and $N = 6$ from the GN school). These exclusions resulted in a sample size of 66 for restricted analyses ($N = 46$ typical and $N = 20$ GN; note that one participant met both exclusion criteria).

Gender Encoding

A Generalized Linear Regression Model with the predictors of school type, gender, age and their interactions, revealed that there was a marginally significant difference in the strength of automatic encoding across school types ($t(79) = 1.946, p = .055, \eta^2_p = 0.046, CI [0.000-$

0.161]), but it was in the opposite direction from our prediction, with children at the GN school scoring somewhat higher than children at the typical schools. There was no effect of participant gender or age, nor were there interactions between variables. When analyzed separately, children at both school types were above chance in their encoding of gender (Typical: $t(49) = 3.661, p < .001$, Cohen's $d = 0.518$, CI [0.241, 0.795]; GN: $t(29) = 4.742, p < .001$, Cohen's $d = 0.866$, CI [0.508, 1.224]). When we repeated the regression with only the restricted sample, the marginal effect of school type on gender encoding remained ($t(64) = 1.992, p = .051, \eta^2_p = 0.058$, CI [0.000-0.193]).

Social Partner Preferences

Unfamiliar playmates. One boy from a typical school refused to participate in this task, resulting in a sample size of 49 children at typical schools and 29 boys total. The average number of choices of same-gender unfamiliar playmates did not differ by school type ($t(78) = 1.138, p = .259, \eta^2_p = 0.014$, CI [0.000 – 0.109]) or age ($t(78) = 0.846, p = .400, \eta^2_p = 0.008$, CI [0.000 – 0.091]), according to a Generalized Linear Regression Model with the predictors of school type, gender, age, and their interactions. However, there was a significant effect of participant gender with girls choosing more same-gender unfamiliar playmates than boys overall ($t(78) = 3.933, p < .001, \eta^2_p = 0.167$, CI [0.042 – 0.311]). Both girls and boys chose same-gender playmates at above chance levels (Girls: $t(49) = 14.935, p < .001$, Cohen's $d = 2.112$, CI [1.835, 2.839]; Boys: $t(28) = 3.730, p < .001$, Cohen's $d = 0.693$, CI [0.329, 1.057]).

Given that the data overall were skewed with 33% of children choosing same-gender playmates on every trial (i.e., a score of “1”), we also compared the likelihood of this response pattern using binomial logistic regression with the same predictors as above. This analysis revealed that children from typical schools were more likely to choose no other-gender

playmates than were children from the GN school ($z(75) = 1.998, p = .046$, odds ratio = 3.311, CI [2.945, 3.721]), and choosing no other-gender playmates was also marginally more likely with increased age in months ($z(75) = 1.724, p = .085$, odds ratio = 1.048, CI [0.993, 1.106]). With the restricted sample, the effect of school type remained ($z(64) = 2.152, p = .031$, odds ratio = 4.759, CI [1.149, 19.708]) as did the marginal effect of age on the rate of choosing all same-gender playmates ($z(64) = 1.921, p = .055$, odds ratio = 1.058, CI [0.999, 1.120]).

Familiar playmates. The number of familiar playmates of the same gender (of total possible 3) chosen by participants did not vary between schools ($W = 664.5, p = .718$, Wilcoxon rank-sum test used because data came from an ordinal 0 to 3 scale with extreme skew).

Children's average proportion of selected same-gender playmates was greater than chance (.5) according to a Wilcoxon signed-ranks test ($V = 2772, p < .001$). The lower power of non-parametric statistics precludes useful analyses of samples further divided by age and gender.

Stereotyping

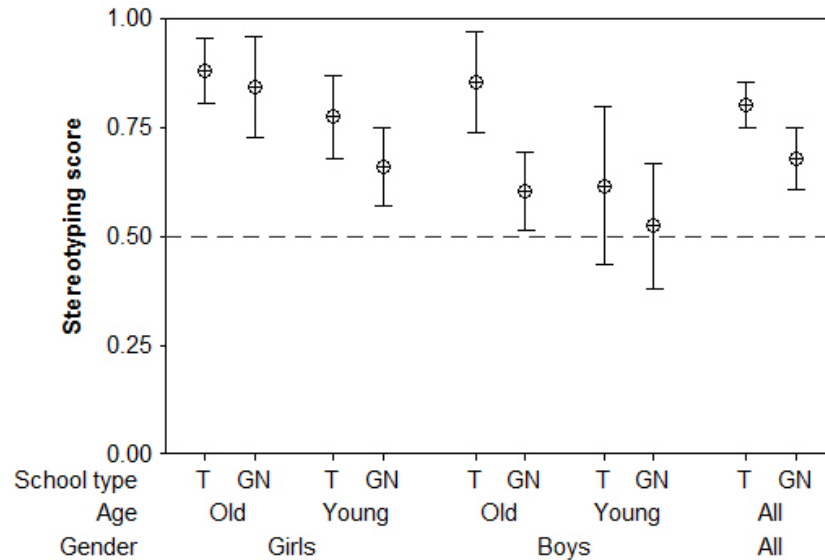
A Generalized Linear Regression Model ($N = 79$ because 1 boy at a typical school refused to complete the task) with the predictors of school type, gender, age, and their interactions revealed effects of school type, gender, and age, such that children at the typical school gave more stereotyped answers than children at the GN school ($t(75) = 2.702, p = .009$, $\eta^2_p = 0.089$, CI [0.006 – 0.219]), girls did so more than boys ($t(75) = 2.286, p = .025$, $\eta^2_p = 0.065$, CI [0.000 – 0.188]), and older children did so more than younger children ($t(75) = 4.580, p < .001$, $\eta^2_p = 0.219$, CI [0.072 – 0.339]); see Figure 1a. No interactions were significant. Tests against chance revealed above-chance stereotyping scores for all groups (Typical: $t(48) = 11.406, p < .001$, Cohen's $d = 1.629$, CI [1.349, 1.909]; GN: $t(29) = 5.170, p < .001$, Cohen's $d = 0.944$, CI [0.586, 1.302]; girls: $t(49) = 12.565, p < .001$, Cohen's $d = 1.777$, CI [1.500, 2.054]; boys:

$t(28) = 4.453, p < .001$, Cohen's $d = 0.827$, CI [0.463, 1.191]; children above the median age:

$t(38) = 13.253, p < .001$, Cohen's $d = 2.122$, CI [1.808, 2.436]; children below the median age:

$t(37) = 5.244, p < .001$, Cohen's $d = 0.851$, CI [0.533, 1.169).

(a)



(b)

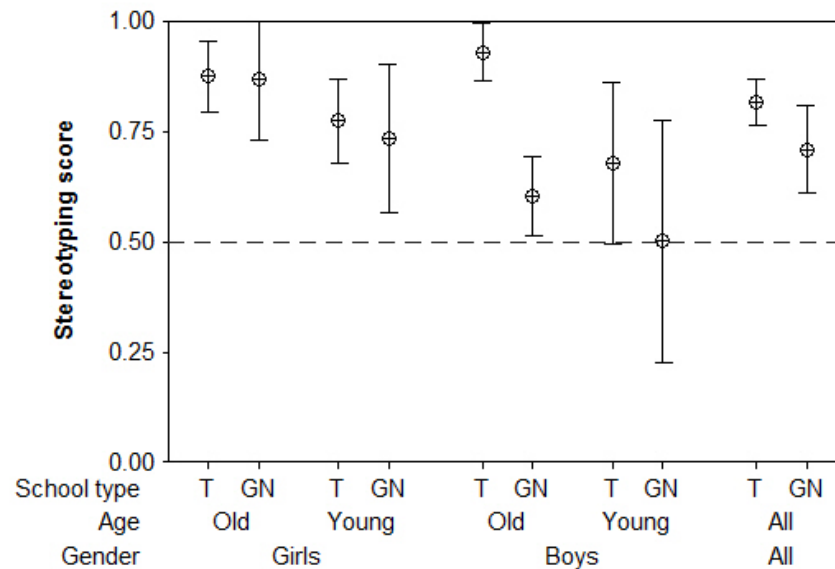


Figure 1. Means and 95% confidence intervals for stereotyping scores from: (a) the full sample ($N = 79$) and (b) the restricted sample ($N = 65$), separated by preschool type (typical: T, gender-neutral: GN), age (median split), and gender. Scores greater than .5 indicate responses in line with cultural stereotypes.

For the restricted sample ($N = 65$), the analysis revealed an interaction between school type and gender ($t(64) = 2.810, p = .007, \eta^2_p = 0.121, CI [0.037 - 0.416]$). Thus, we separated the sample by gender in order to examine the effects of school type and age: girls ($N = 42$) showed only an age effect ($t(40) = 3.388, p = .002, \eta^2_p = 0.223, CI [0.035 - 0.412]$), while for boys ($N = 23$) there was a further interaction between school type and age ($t(19) = 2.102, p = .049, \eta^2_p = 0.189, CI [0.000 - 0.428]$). Boys were then divided at median age and we found that older boys ($N = 11$) showed a school type effect ($t(9) = 6.794, p < .001, \eta^2_p = 0.837, CI [0.465 - 0.908]$), with greater stereotyping at the typical than the GN school, while younger boys ($N = 12$) showed no school type effect ($t(10) = 1.466, p = .174, \eta^2_p = 0.177, CI [0.000 - 0.504]$). Single-sample t-tests showed that only younger boys failed to give stereotyped responses at above chance levels ($t(11) = 1.650, p = .127, \text{Cohen's } d = 0.476, CI [-0.089, 1.042]$). Girls overall ($t(41) = 12.866, p < .001, \text{Cohen's } d = 1.985, CI [1.683, 2.288]$) as well as older boys at both typical ($N = 8; t(7) = 15.601, p < .001, \text{Cohen's } d = 5.516, CI [4.823, 6.209]$) and GN ($N = 3; t(2) = 5.000, p = .038, \text{Cohen's } d = 2.887, CI [1.755, 4.018]$) schools did stereotype above chance. To summarize, the restricted sample analysis confirmed, but also qualified, the effect of school type on the stereotyping task. More specifically, for the restricted sample, we did not observe a main effect of school type; rather, only older boys showed a significant effect of school type (see Figure 1b).

Gender Identification

As noted in the Introduction, the main purpose of the gender identification task was to confirm that participants could identify the gender of target stimuli. Four participants refused to complete this task (2 girls, 2 boys; 3 from typical schools, 1 from the GN school), resulting in a

sample comprised of 48 girls, 28 boys, 47 typical school children, and 29 GN school children. As a group, participants performed well when asked to identify the gender of children with traditional hair (short for boys, long for girls) and gender-informative proper names (see Table 2). In a Generalized Linear Regression Model examining the factors of gender, school type, age, and their interactions, there was a significant effect of age ($t(73) = 2.593, p = .012, \eta^2_p = 0.084, CI [0.004 - 0.217]$), with correct identifications increasing with age. There was also a marginally significant effect of school type ($t(73) = 1.695, p = .094, \eta^2_p = 0.038, CI [0.000 - 0.150]$), with children in typical schools making marginally more correct identifications than those in the GN school. In the restricted sample, there was no longer an effect of age or school type ($ps > .10$) on the gender identification task, as would be expected given that children with the lowest scores were excluded.

Discussion

The findings from the present study provide some support for the hypothesis that differences in gender pedagogy are associated with differences in children's consideration of gender: Gender-neutral pedagogy was associated both with a greater interest in playing with unfamiliar children of another gender, as well as a reduced tendency to assume that unfamiliar boys' and girls' characteristics would align with cultural beliefs. These findings support the proposition that adults' behaviors affect the degree to which children use gender to guide their consideration of other children. Other tasks and analyses, however, provided no support for the hypothesis that gender-neutral pedagogy reduces children's consideration of gender. Children in the GN school did not show less robust automatic encoding of other people's gender; in fact, contrary to our hypothesis, the encoding scores of children at the GN school were somewhat higher than those of children at typical schools. However, in considering the results from the

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4 encoding task, it is worth noting the absence of theory anticipating this result, as well as the
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6 marginal significance of the effect (the p-value was above .05 and the confidence interval for the
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8 effect size included zero). Also contrary to our hypothesis, children in both kinds of schools
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10 were equally likely to choose same-gender peers as preferred playmates in the familiar playmates
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12 task. Finally, analyses of the restricted sample indicated that the effect of school type in the
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14 gender-stereotyping task was only significant for older boys. We discuss each of these findings
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18 in turn below.

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21 First, why did we find that exposure to gender-neutral pedagogy was associated with
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23 moderate reductions in gender in-group favoritism and application of stereotypes? One
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25 possibility is that when adults de-emphasize gender groupings (e.g., “Let’s have all children play
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27 together at the table” rather than “Let’s have all the girls play together in the dress-up area”),
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29 children truly come to believe that gender is a less reliable basis for making judgments about
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31 other people. Such beliefs could in turn make children more open to having play partners of
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33 different genders, and more likely to consider the possibility that other children’s preferences and
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35 actions do not align with cultural stereotypes about boys and girls. A second possibility—which
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37 is not incompatible with the first—is that when teachers specifically work to counteract gender
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39 stereotypes in their classroom (e.g., by modifying songs so that they do not contain gender norms
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41 and by selecting books that feature gender counter-stereotypes; see the Appendix), children are
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43 less aware of gender-based cultural stereotypes. This decreased awareness could lead to a
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45 reduction in gender-based assumptions about others’ toy and clothing preferences, as well as a
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47 greater willingness to play with other-gender children (because children might reason that other-
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49 gender children may very well share their own toy and clothing preferences). The present
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51 research cannot distinguish between these two possibilities (see below for additional discussion).
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4 By contrast, gender-neutralizing practices may not be robust enough to overcome a well-
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6 practiced tendency to take simply note of other people's gender. Unlike gender in-group
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8 favoritism and gender stereotyping, which appear to emerge and strengthen in early childhood
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10 (Ruble et al., 2006), children's ability to tell the difference between males and females is evident
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12 in infancy (Quinn et al., 2011). Once gender categories are identified, gender encoding may be
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14 very difficult to modulate (e.g., via gender-neutral pedagogy). Indeed, studies of adults show
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16 that gender encoding (unlike race encoding) is hard—if not impossible—to suppress, even when
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18 participants are given other ways to classify people (Kurzban et al., 2001).
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24 Another finding that warrants discussion is the discrepancy with respect to the gender
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26 stereotyping results for the full vs. restricted sample. One possibility is that the reduced sample
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28 size for the restricted analysis limited our ability to detect an overall effect of school type for the
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30 sample. Another (not incompatible) possibility is that gender pedagogy has a more pronounced
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32 effect on boys' stereotyping than on girls' stereotyping. Although older boys and girls tend to
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34 perform similarly on stereotype awareness measures (e.g., Blakemore, 2003), girls are more
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36 knowledgeable than boys about gender stereotypes very early in development. For example, one
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38 study showed that girls enacted gender-stereotypical actions with male and female dolls by 24
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40 months of age, while boys only did so reliably by 31 months of age (Poulin-Dubois, Serbin,
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42 Eichstedt, Sen, & Beissel, 2002). Additionally, when tested in a looking-time paradigm, 18- and
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44 24-month-old girls, but not boys, associated stereotypically masculine toys with boys' faces and
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46 stereotypically female toys with girls' faces (Serbin, Poulin-Dubois, Colburne, Sen, &
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48 Eichenstedt, 2001). If girls are more attuned to information about gender stereotypes early in
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50 development, their beliefs may be more entrenched (and potentially less malleable) than those of
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52 boys. Nevertheless, we did not predict that participant gender would interact with school type.
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Further research is necessary in order to confirm (or disconfirm) the effect and explain it. Further research is also necessary to examine whether and how the gender of experimenters (who were female in the present study) might influence children's responses on the gender stereotyping measure, as well as other gender cognition tasks.

Finally, why is it that we detected a school type effect on the unfamiliar playmates task, but not on the familiar playmates task? It seems likely that our familiar playmates measure was not extensive enough to detect a school difference, as we only asked children to provide three names. Regardless, it does appear that GN pedagogy is associated with a greater openness on the part of children when it comes to considering other-gender playmates they have just met.

Limitations and Suggestions for Future Research

The differences we observed between children in GN and typical schools were not uniformly large across measures, and some measures revealed no differences at all. Nevertheless, it is worth mentioning three factors that could have lessened the effects of school setting (or our ability to detect them). First, children attending the GN school of course spent a considerable amount of time in other environments (e.g., their homes, informal playgroups, consuming media). Thus, it is very likely that children heard nouns and pronouns referring to gender, and received exposure to gender stereotypes. Second, because Swedish law requires and emphasizes the importance of gender egalitarian practices in preschool, even children at the typical school experienced some degree of gender-neutrality in their schools. As shown in the Appendix, teachers at the GN school self-reported more rigorous gender-neutral practices, but the mean responses of teachers at typical schools did not suggest they were prone to emphasizing gender in their classrooms. Although it is difficult to compare cultures and studies directly, it is plausible that the practices of teachers in typical Swedish schools are similar to practices of

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4 teachers in “low-salience” classrooms in previous studies conducted in the U.S. (e.g., Bigler,
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6 1995; Hilliard & Liben, 2010). Third, some lack of differences between schools could have been
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8 due to low statistical power associated with our fairly small sample sizes and wide age range.
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10 Moreover, age and time attending preschool were highly correlated, so the effect of length of
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12 attendance could not be assessed. We note that for practical reasons (difficulty of access to and
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14 rarity of GN preschools even in Sweden), increasing the sample size in this study would have
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19 been very challenging.
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21 Although our study is unique in the psychological literature in its focus on how long-term
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23 gender-neutral pedagogy might affect children’s consideration of gender, there are some
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25 methodological limitations to note. One limitation is that we only assessed children’s
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27 consideration of gender in a short testing session conducted outside their classroom. While
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29 controlled testing conditions have some notable advantages (e.g., participants’ responses cannot
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31 be influenced by those around them and all participants can experience exactly the same
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33 procedure), naturalistic observation measures (e.g., observing children’s actual playmate
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35 preferences) or qualitative interviews may reveal other effects of gender-neutral pedagogy on
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37 children’s thoughts and behaviors.
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42 A second limitation is that the practices of teachers in the GN and typical schools differed
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44 in more than one way, and we were unable to conduct systematic observations of classroom
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46 practices. Thus, we cannot ascertain which practices (e.g., avoiding gender language and/or
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48 working to counteract gender stereotypes) may have generated the differences we observed
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50 between children in the GN and typical schools. The data from the teacher questionnaire do,
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52 however, provide some support for the idea that the classroom practices themselves—rather than
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54 transmission of teachers’ general beliefs about gender—are associated with children’s gender
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4 preferences and stereotyping. As shown in the Appendix, teachers in GN and typical schools
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6 responded differently on just one out of the five questions probing beliefs about gender, but they
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8 responded differently on four of the seven questions focused on classroom practices.
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11 A third limitation is that we could not randomly assign children to their schools. The
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13 schools were located in close proximity to one another; participants at the two kinds of schools
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15 had similar family characteristics; and, for the most part, parents did not choose their child's
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17 school based on gender pedagogy. Nevertheless, because children were not randomly assigned
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19 to their schools, we cannot conclude with certainty that experiencing gender-neutral pedagogy
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21 caused the differences we observed between children in the two kinds of schools. Further,
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23 although we collected information about family demographics, we did not have the opportunity
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25 to measure parents' gender-related beliefs or practices at home.
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31 One way to address these limitations would be to conduct research that includes a more
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33 extensive parent questionnaire as well as a baseline assessment of children's consideration of
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35 gender. Because children generally begin preschool at one year of age in Sweden, such a study
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37 would have been very challenging to conduct in the current context, as it would have required
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39 schools to commit to several years of onsite research. Further, such research requires the
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41 development of measures of gender attitudes, stereotyping, and encoding that are (1) appropriate
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43 for children younger than 3 years of age, (2) reliable enough to reveal group differences, and (3)
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45 sufficiently comparable to measures that are commonly used to assess older children's gender
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47 categories.
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53 Despite these challenges, a focus on younger children in future research will be important
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55 given that participants in the present research already showed significant levels of gender-based
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57 responding. Paralleling research conducted with children in a variety of settings in the U.S. (for
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reviews, see Arthur et al., 2008 and Ruble et al., 2006), even participants in the Swedish GN school showed automatic gender encoding, tended to prefer same-gender playmates, and engaged in gender stereotyping. These findings suggest that processes or experiences that occur very early in development—or operate outside the classroom—may promote children’s attention to gender in person perception and evaluation. Understanding the role of experience in guiding children’s consideration of gender may therefore require testing infants and toddlers, including those raised in very different social environments. For example, examining correlations between parents’ tendency to highlight gender in the home (e.g., by using gender labels; see Gelman et al., 2004) and children’s very early consideration of gender could be useful. Additional cross-cultural research focused on young children in different cultures—for example, those raised in relatively egalitarian nations such as Sweden compared with those raised in countries with more traditional or conservative gender roles—could also shed light on how early socialization affects children’s gender cognition.

Conclusions

Beyond contributing to theories of gender categorization, research focused on factors supporting young children’s social preferences and stereotypes is of practical importance. Young children who favor same-gender playmates develop more extreme gender-typed interests and behaviors over time (Martin & Fabes, 2001). Additionally, children become less interested in playing with particular toys once they believe such toys are “for” the other gender (Martin, Eisenbud, & Rose, 1995; see also Bian et al., 2017). These findings are of consequence given that gender-typed behaviors and interests are related to the development of skills associated with success in school (Serbin, Zelkowitz, Doyle, Gold, & Wheaton, 1990). For example, greater compliance with adult direction (a behavior more commonly demonstrated by young girls) is

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4 associated with better academic performance in elementary school (Serbin et al., 1990) and
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6 playing with blocks (a toy stereotypically associated with males) is associated with the
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8 development of better spatial abilities (e.g., Jirout & Newcombe, 2015). Thus, children's social
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10 partner choices and beliefs about objects are related to their social and cognitive development.
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14 The present findings suggest that gender-neutralizing practices may reduce children's
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16 gender in-group favoritism and gender stereotyping. Thus, our findings support the hypothesis
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18 that the practices of teachers have meaningful effects on children's consideration of gender early
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20 in development. Given the consequences associated with gender segregation and stereotyping
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22 described in the previous paragraph, gender-neutral pedagogy appears to be a useful, positive
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24 practice. We also note, however, that the presence of significant gender encoding, preferences,
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26 and stereotyping by young children in the GN school where we tested also indicates that other
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28 factors contribute to children's developing gender categories. This, together with the fact that
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30 most children spend significant periods of time outside their classroom, suggest that policies and
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32 practices aimed at modifying society's consideration of gender will be important to facilitate and
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34 sustain reductions in gender attitudes and stereotypes over time.
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Acknowledgements

The research was supported by grant 421-2011-1785 from the Swedish Research Council

(Vetenskapsrådet).

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References

- Abel, H., & Sahinkaya, R. (1962). Emergence of sex and race friendship preferences. *Child Development, 33*(4), 939-943. doi:10.2307/1126904
- Albert, A.A., & Porter, J.R. (1986). Children's gender role stereotypes: A comparison of the United States and South Africa. *Journal of Cross-Cultural Psychology, 17*(1), 45-65. doi:10.1177/0022002186017001004
- Andrews, N. C., Martin, C. L., Field, R. D., Cook, R. E., & Lee, J. (2016). Development of expectancies about own- and other-gender group interactions and their school-related consequences. *Child Development, 87*(5), 1423-1435.
- Arthur, A. E., Bigler, R. S., Liben, L. S., Gelman, S. A., & Ruble, D. N. (2008). Gender stereotyping and prejudice in young children: A developmental intergroup perspective. In S. R. Levy, M. Killen (Eds.), *Intergroup attitudes and relations in childhood through adulthood* (pp. 66-86). New York, NY US: Oxford University Press.
- Baker, E.R., Tisak, M.S., & Tisak, J. (2016). What can boys and girls do? Preschoolers' perspectives regarding gender roles across domains of behavior. *Social Psychology of Education, 19*, 23-29.
- Bauer, P. J., & Coyne, M. J. (1997). When the name says it all: Preschoolers' recognition and use of the gendered nature of common proper names. *Social Development, 6*(3), 271-291. doi:10.1111/j.1467-9507.1997.tb00106.x
- Bem, S. L. (1983). Gender schema theory: A cognitive account of sex typing. *Psychological Review, 88*, 354-364.

- Bem, S. L. (1983). Gender schema theory and its implications for child development: Raising gender-aschematic children in a gender-schematic society. *Signs*, 8(4), 598-616.
doi:10.1086/493998
- Bennett, M., & Sani, F. (2003). The role of target gender and race in children's encoding of category-neutral person information. *British Journal of Developmental Psychology*, 21(1), 99-112.
- Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science*, 355(6323), 389-391.
- Bigler, R. S. (1995). The role of classification skill in moderating environmental influences on children's gender stereotyping: A study of the functional use of gender in the classroom. *Child Development*, 66(4), 1072-1087. doi:10.2307/1131799
- Bigler, R. S., & Liben, L. S. (2007). Developmental intergroup theory: Explaining and reducing children's social stereotyping and prejudice. *Current Directions in Psychological Science*, 16(3), 162-166. doi:10.1111/j.1467-8721.2007.00496.x
- Blakemore, J. E. O. (2003). Children's beliefs about violating gender norms: Boys shouldn't look like girls, and girls shouldn't act like boys. *Sex Roles*, 48(9/10), 411-419.
- Bussey, K., & Bandura, A. (1984). Influence of gender constancy and social power on sex-linked modeling. *Journal of Personality and Social Psychology*, 47, 1292-1302.
- Cosmides, L., Tooby, J., & Kurzban, R. (2003). Perceptions of race. *Trends in Cognitive Sciences*, 7(4), 173-179. doi:10.1016/S1364-6613(03)00057-3
- de Guzman, M.R.T., Carolo, G., Ontai, L.L., Koller, S.H., & Knight, G.P. (2004). Gender and age differences in Brazilian children's friendship nominations and peer sociometric ratings. *Sex Roles*, 51(3/4), 217-225.

Dunham, Y., Baron, A.S., & Banaji, M.R. (2016). The development of implicit gender attitudes.

Developmental Science, 19(5), 781-789.

Edström, C. (2009). Preschool as an arena of gender policies: The examples of Sweden and

Scotland. *European Educational Research Journal*, 8(4), 534-549.

Eidevald, C. (2009). *Det finns inga tjejbestämmare: att förstå kön som position i förskolans*

vardagsrutiner och lek. (Doctoral dissertation), School of Education and Communication,

Jönköping University. Retrieved from [http://hj.diva-](http://hj.diva-portal.org/smash/record.jsf?pid=diva2:158528)

[portal.org/smash/record.jsf?pid=diva2:158528](http://hj.diva-portal.org/smash/record.jsf?pid=diva2:158528)

Gelman, S. A., Taylor, M. G., & Nguyen, S. P. (2004). Mother-child conversations about gender:

Understanding the acquisition of essentialist beliefs: Abstract. *Monographs of the Society*

for Research in Child Development, 69(1), vii, 116-127. doi:10.1111/j.1540-

5834.2004.06901001.x

Gershman, E. S., & Hayes, D. S. (1983). Differential stability of reciprocal friendships and

unilateral relationships among preschool children. *Merrill-Palmer Quarterly* (1982-),

169-177.

Good, P. (2005). *Permutation, parametric, and bootstrap tests of hypotheses* (3rd ed.). New

York: Springer.

Grace, D. M., David, B. J., & Ryan, M. K. (2008). Investigating preschoolers' categorical

thinking about gender through imitation, attention, and the use of self-categories. *Child*

Development, 79(6), 1928-1941. doi:10.1111/j.1467-8624.2008.01234.x

Halpern, D. F., Eliot, L., Bigler, R. S., Fabes, R. A., Hanish, L. D., Hyde, J., Liben, L. S., &

Martin, C. L. (2011). The pseudoscience of single-sex schooling. *Science*, 333, 1706-

1707.

1
2
3
4 Heikkilä, M. (2011). Kunskapsöversikt: Förskolan som genusarena. Retrieved 11th November,
5
6 2013, from [http://genus.se/meromgenus/teman/skola/forskola/kunskapsoversikt--](http://genus.se/meromgenus/teman/skola/forskola/kunskapsoversikt--forskola/)
7
8 [forskola/](http://genus.se/meromgenus/teman/skola/forskola/kunskapsoversikt--forskola/)
9

10
11 Hilliard, L. J., & Liben, L. S. (2010). Differing levels of gender salience in preschool
12
13 classrooms: Effects on children's gender attitudes and intergroup bias. *Child*
14
15 *Development, 81*(6), 1787-1798. doi:10.1111/j.1467-8624.2010.01510.x
16
17

18
19 Jirout, J.J., & Newcombe, N.S. (2015). Building blocks for developing spatial skills: Evidence
20
21 from a large, representative U.S. sample. *Psychological Science, 26*(3), 302-310. doi:
22
23 10.1177/0956797614563338
24
25

26
27 Knobloch, S., Callison, C., Chen, L., Fritzsche, A., & Zillman, D. (2005). Children's sex-
28
29 stereotyped self-socialization through selective exposure to entertainment: Cross-cultural
30
31 experiments in Germany, China, and the United States. *Journal of Communication, 55*(1),
32
33 122-138. doi: 10.1111/j.1460-2466.2005.tb02662.x
34
35

36
37 Kuhn, D., Nash, S. C., & Brucken, L. (1978). Sex role concepts of two- and three-year-olds.
38
39 *Child Development, 49*(2), 445-451. doi:10.2307/1128709
40

41
42 Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and
43
44 social categorization. *Proceedings of the National Academy of Sciences USA, 98*(26),
45
46 15387-15392.
47

48
49 LaFreniere, P. J., Strayer, F. F., & Gauthier, R. (1984). The emergence of same-sex affiliative
50
51 preferences in children's play groups: A developmental/ethological perspective. *Child*
52
53 *Development, 55*, 1958-1965.
54
55
56
57
58
59
60
61
62
63
64
65

- 1
2
3
4 Leinbach, M., Hort, B. E., & Fagot, B. I. (1997). Bears are for boys: Metaphorical associations in
5
6 young children's gender stereotypes. *Cognitive Development, 12*(1), 107-130.
7
8 doi:10.1016/S0885-2014(97)90032-0
9
- 10
11 Maccoby, E. E., & Jacklin, C. (1987). Gender segregation in childhood. In H. W. Reese (Ed.) ,
12
13 *Advances in child development and behavior, Vol. 20* (pp. 239-287). San Diego, CA US:
14
15 Academic Press. doi:10.1016/S0065-2407(08)60404-8
16
17
- 18
19 Malcolm, S., Defeyter, M.A., & Friedman, O. (2014). Children and adults use gender and age
20
21 stereotypes in ownership judgments. *Journal of Cognition and Development, 15*, 123-
22
23 135.
24
25
- 26
27 Martin, C. L. (1989). Children's use of gender-related information in making social judgments.
28
29 *Developmental Psychology, 25*(1), 80-88. doi:10.1037/0012-1649.25.1.80
30
- 31
32 Martin, C.L., Eisenbud, L., & Rose, H. (1995). Children's gender-based reasoning about toys.
33
34 *Child Development, 66*, 1453-1471.
35
- 36
37 Martin, C.L., & Fabes, R.A. (2001). The stability and consequences of young children's same-
38
39 sex peer interactions. *Developmental Psychology, 37*(3), 431-446.
40
- 41
42 Martin, C., Fabes, R. A., Evans, S. M., & Wyman, H. (1999). Social cognition on the
43
44 playground: Children's beliefs about playing with girls versus boys and their relations to
45
46 sex segregated play. *Journal of Social And Personal Relationships, 16*(6), 751-771.
47
48 doi:10.1177/0265407599166005
49
- 50
51 Martin, C.L., & Halverson, C.F. (1981). A schematic processing model of sex typing and
52
53 stereotyping in children. *Child Development, 52*, 1119-1134.
54
55
56
57
58
59
60
61
62
63
64
65

- Martin, C. L., & Little, J. K. (1990). The relation of gender understanding to children's sex-typed preferences and gender stereotypes. *Child Development, 61*(5), 1427-1439.
doi:10.2307/1130753
- Martin C. L., Ruble D. N., Szkrybalo J. (2002). Cognitive theories of early gender development. *Psychological Bulletin, 128*(6), 903–933.
- Muthkrishna, N., & Sokoya, G.O. (2008). Gender differences in pretend play amongst school children in Durban, Kwazulu-Natal, South Africa. *Gender and Behaviour, 6*(1), 1577-1590.
- Odenbring, Y. (2010). *Kramar, kategoriseringar och hjälpfröknar: könskonstruktioner i interaktion i förskola, förskoleklass och skolår ett.* (Doctoral dissertation), University of Gothenburg, Gothenburg. Retrieved from <http://hdl.handle.net/2077/22144>
- Peterson, C. C., & Siegal, M. (2002). Mindreading and moral awareness in popular and rejected preschoolers. *British Journal of Developmental Psychology, 20*(2), 205-224.
doi:10.1348/026151002166415
- Poulin-Dubois, D., Serbin, L. A., Eichstedt, J. A., Sen, M. G., & Beissel, C. F. (2002). Men don't put on make- up: Toddlers' knowledge of the gender stereotyping of household activities. *Social Development, 11*(2), 166-181.
- Quinn, P.C., Anzures, G., Izard, C. E., Lee, K., Pascalis, O., Slater, A. M., & Tanaka, J. W. (2011). Looking across domains to understand infant representation of emotion. *Emotion Review, 3*(2), 197-206.
- Quinn, P.C., Yahr, J., Kuhn, A., Slater, A.M., & Pascalis, O. (2002). Representation of the gender of human faces by infants: A preference for female. *Perception, 31*, 1109-1121.

- Renno, M.P., Shutts, K. (2015). Children's social category-based giving and its correlates: Expectations and preferences. *Developmental Psychology*, 51(4), 533-43. doi: 10.1037/a0038819
- Ruble, D. N., Martin, C., & Berenbaum, S. A. (2006). Gender Development. In N. Eisenberg, W. Damon, R. M. Lerner (Eds.), *Handbook of child psychology: Vol. 3, Social, emotional, and personality development (6th ed.)* (pp. 858-932). Hoboken, NJ US: John Wiley & Sons Inc.
- Serbin, L. A., Poulin-Dubois, D., Colburne, K. A., Sen, M. G., & Eichstedt, J. A. (2001). Gender stereotyping in infancy: Visual preferences for and knowledge of gender-stereotyped toys in the second year. *International Journal of Behavioral Development*, 25(1), 7-15.
- Serbin, L.A., Zelkowitz, P., Doyle, A-B., Gold, D., & Wheaton, B. (1990). The socialization of sex-differentiated skills and academic performance: A mediational model. *Sex Roles*, 23(11), 613-628.
- Shutts, K. (2013). Is gender 'special'? In M.R. Banaji & S.A. Gelman (eds.), *Navigating the social world: The early years*. (pp. 297-300). New York: Oxford University Press.
- Shutts, K., Banaji, M. R., & Spelke, E. S. (2010). Social categories guide young children's preferences for novel objects. *Developmental Science*, 13(4), 599-610. doi:10.1111/j.1467-7687.2009.00913.x
- Shutts, K., Roben, C., & Spelke, E. S. (2013). Children's use of social categories in thinking about people and social relationships. *Journal of Cognition and Development*, 14(1), 35-62. doi:10.1080/15248372.2011.638686
- Skolverket. (2011). *Läroplan för förskolan* Retrieved June 5, 2015 from <http://www.skolverket.se/laroplaner-amnen-och-kurser/forskola>

- Skolverket. (2014). Fler barn än någonsin i förskolan. Retrieved August 28th, 2014, from <http://www.skolverket.se/statistik-och-utvardering/nyhetsarkiv/2.7608/fler-barn-an-nagonsin-i-forskolan-1.170263>
- Taylor, S. E., Fiske, S. T., Etcoff, N. L., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality And Social Psychology*, *36*(7), 778-793.
- Wahlström, K. (2003). *Flickor, pojkar och pedagoger: jämställdhetspedagogik i praktiken*. Stockholm: Sveriges utbildningsradio.
- Waxman, S. R. (2010). Names will never hurt me? Naming and the development of racial and gender categories in preschool-aged children. *European Journal of Social Psychology*, *40*(4), 593-610. doi:10.1002/ejsp.732
- Weinraub, M., Clemens, L., Sockloff, A., Ethridge, T., Gracely, E., & Myers, B. (1984). The development of sex role stereotypes in the third year: Relationships to gender labeling, gender identity, sex-typed toy preference, and family characteristics. *Child Development*, *55*(4), 1493-1503. doi:10.2307/1130019
- Weisman, K., Johnson, M.V., & Shutts, K. (2015). Young children's automatic encoding of social categories. *Developmental Science*, *18*, 1026-1043.
- Wernersson, I. (Ed.). (2009). *Genus i förskola och skola : förändringar i policy, perspektiv och praktik*. Gothenburg: Acta Universitatis Gothoburgensis.
- World Economic Forum. (2016). Global Gender Gap Report 2016. Geneva, Switzerland.
- World Economic Forum. (2015). Global Gender Gap Report 2015. Geneva, Switzerland.
- Zosuls, K.M., Ruble, D.N., Tamis-Lemonda, C.S., Shrout, P.E., Bornstein, M.H., & Greulich, F.K. (2009). The acquisition of gender labels in infancy: Implications for gender-typed

play. *Developmental Psychology*, 45, 688-701.

1
2
3
4
5
6
7
8
9
10
11
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Table 1. Comparison of Sample Characteristics between the Typical and Gender-Neutral Schools

	Typical	GN	Comparison	<i>p</i>
Children				
<i>N</i>	50	30		
% girls	62.0	63.3	$\chi^2(1) = 0.014$	0.905
<i>M</i> age (months)	59.0	56.6	$t(53) = 0.914$	0.365
Girls	60.3	59.2	$t(48) = 0.335$	0.739
Boys	56.9	52.0	$t(28) = 1.191$	0.244
<i>SD</i> age	10.1	12.1	$F(49,29) = 0.693$	0.252
Girls	10.0	11.7	$F(30,18) = 0.732$	0.437
Boys	10.1	12.0	$F(18,10) = 0.716$	0.516
Min. age	38.6	36.3		
Girls	38.6	36.3		
Boys	40.8	38.1		
Max. age	73.4	74.3		
Girls	73.4	74.3		
Boys	70.6	73.2		
Parents				
Questionnaire return rate	66.0	70.0	$\chi^2 = .015$	0.902
% same-gender parents	0	0		
Mother age	38.3	39.2	$t(49) = 0.731$	0.468
Father age	39.6	42.1	$t(47) = 1.417$	0.163
% of mothers with university degree	75.8	72.2	$t(49) = 0.272$	0.787
% of fathers with university degree	75.0	76.5	$t(47) = 1.176$	0.245
Mothers' time spent on parental leave (months)	14.7	11.9	$t(47) = 1.250$	0.218
Fathers' time spent on parental leave (months)	7.8	6.2	$t(45) = 0.656$	0.515
Mothers' current working hours (% of full time)	79.9	89.7	$t(48) = 1.080$	0.286
Fathers' current working hours (% of full time)	92.6	96.6	$t(45) = 0.623$	0.536
% mothers immigrated	11.1	9.4	$t(48) = 0.193$	0.848
% fathers immigrated	23.5	25.0	$t(47) = 0.112$	0.912

Note: Some parents neglected to provide information about one or more of the items listed in the "Parents" section of the table.

Table 2. Descriptive Statistics for All Variables

	Typical Schools			GN School			Both School Types		
	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All
Encoding score	1.32 (2.23)	0.82 (2.13)	1.13 (2.18)	2.26 (2.44)	2.00 (2.72)	2.17 (2.50)	1.68 (2.33)	1.25 (2.39)	1.52 (2.35)
Unfamiliar playmate score	0.88 (0.15)	0.67 (0.27)	0.80 (0.23)	0.80 (0.17)	0.67 (0.20)	0.75 (0.19)	0.85 (0.16)	0.67 (0.24)	0.78 (0.21)
Unfamiliar playmate (# and % choosing all same-gender playmates)	14/31 45%	5/18 28%	19/49 39%	5/19 26%	0/11 0%	5/30 17%	19/30 63%	5/49 10%	24/79 30%
Familiar playmate (# of same-gender choices)	2.34 Mdn=3	2.26 Mdn=3	2.31 Mdn=3	2.67 Mdn=3	2.00 Mdn=2	2.41 Mdn=3	2.47 Mdn=3	2.17 Mdn=2	2.35 Mdn=3
Stereotyping score	0.82 (0.17)	0.76 (0.21)	0.80 (0.18)	0.76 (0.17)	0.55 (0.15)	0.68 (0.19)	0.80 (0.17)	0.68 (0.22)	0.75 (0.19)
Identification score	0.95 (0.10)	0.91 (0.16)	0.93 (0.13)	0.88 (0.17)	0.82 (0.21)	0.86 (0.19)	0.92 (0.14)	0.88 (0.18)	0.91 (0.15)

Note: Values are based on the full sample. Means are listed first, followed by standard deviations in parentheses, with two exceptions: 1) “Unfamiliar playmate (# choosing all same-gender choices)” lists frequencies; 2) “Familiar playmate” choices lists means and medians (mdn) due to non-parametric statistics used in the analyses. Possible scores for the encoding task range from -8 to 16; possible scores on the unfamiliar playmate task range from 0 to 1; the frequency of choosing all same-gender choices for the unfamiliar playmate task is given out of the number of possible children in that group; the possible number of same-gender familiar playmates ranges from 0 to 3; possible scores for the stereotyping task range from 0 to 1; and possible scores for the gender identification task range from 0 to 1.

Appendix

We asked teachers at the GN and typical schools to complete a questionnaire with questions about their gender-relevant classroom behaviors ($N = 7$ questions) and beliefs about gender ($N = 5$ questions). Teachers answered each question using a Likert scale that ranged from 1 (strongly disagree) to 6 (strongly agree). Table A1 presents all the items on the questionnaire, teachers' responses to all these items, and statistical tests comparing responses from teachers at the GN ($N = 16$) and typical ($N = 14$) schools. We used the standard two-sample permutation test (Good, 2005) with 1,000,000 samples to compare responses at the two kinds of schools because distributions for many items were too skewed for parametric analysis. According to teachers' responses, the majority of probed potential gender-neutral classroom practices were more frequent in the GN school than in typical schools; none were more frequent in the typical schools. There was less clear evidence, however, that teachers in GN and typical schools had different personal beliefs about gender.

Table A1. Self-Reported Classroom Practices and Beliefs of Typical and Gender-Neutral Preschool Teachers

	Typical		GN		<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Classroom Practices						
I have used rhymes or songs that have been changed to avoid confirming gender norms [Swedish example included].	5.8	0.5	6.0	0.0	.037	0.80
When I talk to children I avoid using words like “boy” and “girl” which specify gender.	4.4	1.7	5.9	0.5	.003	1.16
I sometimes use gender-neutral personal pronouns such as “hen” [a recently invented Swedish word] or “it”.	3.8	1.8	5.4	1.2	.011	1.04
Families in the stories I tell to children often have a mother and a father.	3.7	1.5	4.0	1.4	.663	0.17
I specifically seek out books that have non-stereotypical gender roles and family structures.	3.9	1.5	5.2	1.5	.026	0.91

I can imagine a situation in a preschool where it is appropriate to treat a girl differently than a boy.	1.0	0.0	1.7	1.4	.099	0.65
I encourage children to play with toys and engage in activities that are against gender stereotypes.	5.6	1.3	5.2	1.1	.565	0.26
Gender Beliefs						
Differences between boys' and girls' behavior that depend on biology instead of culture are almost or totally non-existent.	5.3	1.2	3.7	2.0	.024	0.94
It's a big problem that children are exposed to too many normative stereotypes about gender.	4.6	1.6	5.6	1.3	.071	0.72
Before the Swedish word "snippa" came into use it was a problem that there was no neutral word for girls' genitalia.	4.4	2.0	5.3	1.3	.139	0.56
It's good for children to be able to wear whatever clothes they want, even if the clothes are intended for the other gender.	6.0	0.0	6.0	0.0	1.00	0.00
It's only natural that boys tend to play more with cars and girls tend to play more with dolls and soft toys.	1.5	0.9	1.8	1.2	.589	0.28

Highlights

We compared children in a gender-neutral preschool to those attending other preschools in Sweden.

Children at the gender-neutral school scored lower on a gender stereotyping measure.

Children at the gender-neutral school were more willing to play with unfamiliar other-gender children.

Children at the gender-neutral school were not less likely to notice another person's gender.

Differences in pedagogy are associated with how children think and feel about people based on their gender.