The Patterns of Children’s and Caregivers’ Gender-Typed Exhibit Choices in a Pop-Up Children’s Museum

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ABSTRACT. A children’s museum is a place to explore and play. It allows children and caregivers to choose among a variety of exhibits. We were interested in visitors’ choices to play in exhibits that included activities typed for their gender. We observed 71 family groups for 15 minutes each and noted the extent to which children and caregivers chose exhibits typed for their gender. We found that, for the majority of the time during our observation, women, men, and boys chose exhibits that included activities not typed for their gender, whereas girls spent the majority of the time during our observation at exhibits that included activities typed for their gender. These findings suggest that museums may allow for a kind of freedom from certain expectations for children’s play.

Keywords: children’s museums, gender, gender stereotypes, exhibit choice

Un museo para niños es un lugar para explorar y jugar. Permite a los niños y cuidadores elegir entre una variedad de exhibiciones. Estábamos interesados en las selecciones de los visitantes para jugar en exhibiciones que incluían actividades tipificadas para su género. Observamos 71 grupos familiares durante 15 minutos cada grupo y notamos hasta qué punto los niños y los cuidadores eligieron exhibiciones escritas para su género. Descubrimos que, durante la mayor parte del tiempo durante nuestra observación, las mujeres, los hombres, y los niños varones eligieron exhibiciones que incluían actividades no tipificadas para su género, mientras que las niñas pasaron la mayor parte del tiempo durante nuestra observación en exhibiciones que incluían actividades tipificadas para su género. Estos hallazgos sugieren que los museos pueden permitir una especie de libertad de ciertas expectativas para el juego de los niños.

Palabras clave: museos para niños, género, estereotipos de género, elección de exhibición
Families in many communities in the United States have the privilege of leaving their distractions at home and visiting a space such as a children’s museum that was intentionally designed for exploration, play, and learning. Children and family members choose exhibits to play in and spend as little or as much time as they want in each one. The freedom to explore and play is fundamental to the children’s museum and is a part of how children learn there (Callanan et al., 2020; Dierking & Falk, 1994).

The aim of the current study was to measure the extent to which family members chose to visit exhibits that did and did not include activities that were stereotypically associated with their gender. We wanted to better understand visitors’ choices over time during their visit. Specifically, we wanted to know to what extent visitors choose and stay at exhibits with activities stereotypically associated with their gender and to what extent they explore exhibits with activities associated with other genders or that include gender-neutral activities. Gender schema theory (Martin & Halverson, 1981; Martin et al., 2002) suggests that children would identify the exhibits that were appropriate for their gender and be more likely to play in those exhibits than in those that appeared to be for other genders. Alternatively, it is possible that some of the advances in gender representation since 1990 in the United States (e.g., five women on the Supreme Court; the first ever woman who won the Democratic nomination for President of the United States in 2016; 15% of CEOs are female, up from 0% in 1995) might have made an environment where children of all genders feel more freedom to explore outside of gender norms. We wanted to measure whether such advances would reveal themselves in children’s choices in the museum and be different from similar investigations inside of children’s museums in the 1990s (Greenfield, 1995; Kremer & Mullins, 1992; Luria & Herzog, 1991). This investigation is important because it provides evidence about the extent to which children’s museums are places where visitors are constrained by gender stereotypes and the extent to which they feel some freedom to explore outside those stereotypes, perhaps showing whether societal changes over time show up in the museum. When institutions make it possible for people to step outside the norms that say people with a certain gender have to behave in certain ways, more advances in gender representation may be possible. For example, U.S. society continues to advance in its acknowledgment of people who identify as nonbinary on the gender spectrum. In this article, we attempted to support such an acknowledgement by using nonbinary language as much as possible. Institutions such as children’s museums might afford tighter or looser constraints on gendered behavior than has been observed in other settings such as schools, homes, and with toys.

### Gendered Behavior in School and Home Settings

The play behaviors of children of different genders have been studied since at least the 1970s, and these studies show that as early as age 2, many children show gendered preferences for playmates and types of play (e.g., rough-and-tumble play, circle games such as hand-clapping games; Alexander & Hines, 1994; DiPietro, 1981; Fishbein & Imai, 1993; Jacklin & Maccoby, 1978; Leaper & Farkas, 2015; Maccoby and Jacklin, 1987; Martin et al., 2013; see Mathur & Parameswaran, 2015, for the early origins of gendered play in European-American society). At the same time, there appear to be moments when some children demonstrate less or little gendered play. For example, Mathur and Parameswaran (2015) found that Mexican migrant children engaged in little if any gendered play in Head Start preschools. In addition, Goble et al. (2012) observed that, whereas boys and girls preferred gender-typed activities when they were alone, girls engaged in less gender-typed play when with boys, and boys engaged in less gender-typed play when the teacher was nearby.

In addition to playmates and types of play, many children have tended to show, even into the mid 2010s, gendered preferences for play with particular toys (Dinella & Weisgram, 2018; Fagot & Patterson, 1969; Fulcher & Hayes, 2018; Liss, 1981; Vance & McCall, 1934). These preferences seem to be shaped by several factors including the person playing with the toy (Shutts et al., 2010) and the color of the toy (Weisgram et al., 2014). For example, in a clever experiment that tested children’s interests in toys and manipulated their colors, Weisgram et al. (2014) found that girls were equally interested in stereotypic girls’ toys and stereotypic boys’ toys that had been painted pink and purple. That is, girls were as likely to be interested in a tea set as they were in a monster truck that had been painted pink or purple. The boys did not show the same pattern; they were not more likely to play with a tea set in masculine colors compared to masculine toys in their typical colors or masculine toys painted pink and purple. In other words, boys preferred toys aligned with their gender no matter the color, and girls explored more widely when toys were in female-stereotyped colors of pink and purple.

### Gendered Behavior in Museum Settings

Most work on gender in museums has focused on the behavior of the parents. One line of work has examined the way that parents’ talk is different with their daughters compared to their sons. At science exhibits in a children’s museum, Crowley et al. (2001) found that parents of both genders or that include gender-neutral activities. Gender
in their tendency to interact with their children and the exhibits or stand back and observe. Observations reveal that fathers tend to be more interactive with the exhibits and their children in museums and science centers compared to mothers who tend to observe (Diamond, 1986; Dierking & Falk, 1994; Garner, 2015; Koran et al., 1986; Nadelson, 2013; see Diamond, 1994, for a review of gendered behavior in science museums).

In addition to the data on the way parents of different genders behave in the museum, at least three studies have focused on the way children (and sometimes, parents) of different genders were attracted to different kinds of exhibits as well as how they behaved at those exhibits (Greenfield, 1995; Kremer & Mullins, 1992; Luria & Herzog, 1991). Overall, all three studies found differences by gender, but each was slightly different.

Kremer and Mullins (1992) observed children at the Center for Science and Industry in Columbus, Ohio. They focused on five exhibits in KIDSPACE: water jets, bubbles, face paints, animal lab, and build-a-house. The researchers did not categorize each exhibit a priori as gendered in any way. Instead, they counted the number of girls and boys who visited each exhibit, and they described the children’s behavior at each exhibit. They found no difference in the number of girls and boys who visited each of five exhibits, yet they did find differences when they examined the children’s behavior at the exhibits. For example, at the water jets exhibit, they found that more boys (28%) than girls (1%) pretended that the water jets were guns. Also, they found that more girls (35%) than boys (5%) showed nurturing behavior at the animal lab exhibit.

Unlike Kremer and Mullins (1992), the other two studies did find differences in the number of girls and boys who visited certain exhibits. Luria and Herzog (1991) observed school-aged children at three exhibits at the Boston Children’s Museum during school trips: an automobile, computers, and a grocery store. The authors thought that the automobile and grocery store were potentially gender-typed, yet they stated that the museum staff thought those exhibits drew girls and boys equally. Their observations revealed that more boys (42%) than girls (29%) visited the automobile, and more boys (33%) than girls (23%) visited the computers. Conversely, more girls (48%) than boys (25%) visited the superette grocery store.

Greenfield (1995) observed children with their parents as well as alone at 34 exhibits separated into four categories at the special “aMAZing Science” area at the Bishop Museum in Honolulu: the human body, physical science principles, puzzles, and computer games. Greenfield did not have a priori code the exhibits as aligning with one gender or another, but she did find differences in visits by the children’s gender. Whether children were alone or with their parents, the same patterns emerged, although the differences by gender were weaker when children were with their parents. When children were with their parents, more boys than girls visited three of the four kinds of exhibits: those focused on the human body (56% and 44%, respectively); those focused on physical science (56% and 44%, respectively); and those focused on computers (65% and 35%, respectively). One kind of exhibit saw more girls than boys visit, and that was puzzles (61% and 39%, respectively). Of note, Greenfield’s (1995) observations of adults revealed that men and women did not differ in their exhibit choices; they all tried out all the exhibits relatively equally.

Of particular interest to our investigation was that Luria and Herzog (1991) and Greenfield (1995) focused on the data that showed that the children in their studies were most likely to visit exhibits that included stereotypic activities for their own gender (i.e., automobiles computers, and science for boys, grocery stores and puzzles for girls). Yet, their results also showed that children visited exhibits that included activities that were stereotypical for other genders. The fact that children spread their attention across multiple kinds of exhibits got little attention. In the current study, we designed our methodology so that we could follow family members around the museum and document their choices over time, enabling us to see when children chose exhibits with activities stereotypical of their own gender and when they chose exhibits with activities for other genders. This methodology allowed us to report data in the same way as previous studies (i.e., what was the percentage of boys and girls at a target exhibit), as well as report data on the sequence of exhibit choices family members made during a 15-minute period. Looking at the data in both of these ways allowed for a fuller picture of the exhibit choices made by family members.

For the two different ways of looking at the data, there were a few possibilities of what could result. When looking at specific exhibits and not following people, we could replicate the previous results and show that a greater percentage of boys and girls visited exhibits that include activities that were stereotypic for their gender. Such a finding would be consistent with gender schema theory (Martin & Halverson, 1981; Martin et al., 2002). Alternatively, results could show that things have changed in the intervening 30 years and girls and boys do not show a preference for exhibits that include stereotypic activities for their gender. For our methodology of following visitors around the museum, there were at least three possible patterns for children’s and adults’ choices of where to play and how much they would stay or move about the museum. The first possibility was that...
they could choose an exhibit that was specific to their
gender and either stay there or move to other exhibits
that were typed for their gender. Such a finding would
be consistent with gender schema theory (Martin &
Halverson, 1981; Martin et al., 2002). A second pos-
sibility was that they could choose an exhibit that was
not typed for their gender and stay at those types of
exhibits. The third possibility was that they could vary
their choices and play at some exhibits that were typed
for their gender, some that were not typed for their
gender, and some that were gender-neutral.
In the present study we observed children with their
families for approximately fifteen minutes, separated into
five 3-minute snapshots. At the start of each snapshot,
we noted the exhibit that each family member chose to
visit. These observations allowed us to test whether our
data replicated the findings from the three studies in the
1990s (Greenfield, 1995; Kremer & Mullins, 1992; Luria &
Herzog, 1991), and they also allowed us to observe the
movement of visitors among exhibits that aligned with
their gender, those that aligned with other genders, and
gender-neutral exhibits. Although the previous work
on this topic categorizes activities as associated with
males or females, we seek to acknowledge the ways in
which gender can be nonbinary. Thus, we attempt to use
language, such as “other genders” to avoid an either/or
gender classification.

Method

Research Setting

Our research team collected data over the summer of
2019 at MYTown Museum, a pop-up children’s museum
in Salinas, California. MYTown was designed and cre-
ated by a team of community organizations led by the
director of the Salinas Center for Arts and Culture and
the executive director of MY Museum, the children’s
museum in nearby Monterey (Herrera, 2019). The
museum was located in a wide-open indoor space in
the Salinas Center for Arts and Culture in downtown Salinas, which was approximately 2,950 square feet
with an additional outdoor patio space. The layout was
ideal for our observations because everything could be
observed from one vantage point in the middle of the
room. The museum was designed to represent Salinas
and contained exhibits such as a library, a theatre, a
grocery store, roads, and buildings. In addition, there
was an outdoor area connected to the indoor area and it
contained a farmer’s market, tents for camping, a Lincoln
Log building area, and kayaks. There was no admission
fee to enter the museum, and families could stay as long
as they wanted. The museum was open in June and July
of 2019 and welcomed 5800 visitors.
The setting of our research was in a largely Latinx
community, and we used methods sensitive to this
population. In particular, we chose not to record audio
and video, and we chose not to collect any identifying
information from participants as a way to reduce
concerns that were present in this community in 2019
regarding immigration and deportation. Thus, we
observed families without any interaction with them.
One drawback of this approach is that we guessed the
gender of visitors based on physical characteristics
and clothes. We acknowledge the crudeness of this
approach, but we did so in order to minimize any intrusions on
visitors’ experience in the museum. Signage at the
entrance to the museum stated that students from the
psychology department at the local university were
observing families to better understand child devel-
oment. Gutwill (2003) found that 75% of museum
visitors read such signs. In addition, we made ourselves
noticeable in the museum with a white T-shirt that said
CSUMB on the front and “researcher” on the back, and
a few adults asked us questions about our project. We
answered any questions they had. Our campus review
board approved our study in May 2019 (#19-106-K38).

Participants

We observed 71 families with no contact between
researchers and families. The following demographic
information is based on our best estimate from our
observations. There were 133 children, 50% female. One
person was categorized as nonbinary. The girls’ M age
= 4.03, the boys’ M age = 4.58, and both groups ranged
from infancy to 10-years-old. In addition, there were 119
caregivers, 65% female. One person was categorized as
nonbinary. Caregivers’ ages ranged from 20s to 60s, M
= 30. There were 16 different family compositions. The
most common were: one adult and one child (23%), two
adults and one child (21%), two adults and two children
(21%), and one adult and two children (15%). During
our observations, we attempted to listen for language,
and the following is the language and the percentage
of families in our sample who we heard speaking each
language: English (78.9%), Spanish/English (8.5%),
Uncertain (7.0%), Spanish (4.2%), and other (1.4%).

Measures

We created a form built on Fasoli’s (2014) work that
allowed us to record all observations by hand. It included
the estimated age and apparent gender of each individual
in the family units, the exhibit that each family member
was in during each of five snapshots, the action that
each member engaged in during each snapshot, and
the language spoken by the family. For the purposes of
this paper, we focus on the section of the form where
we noted the exhibits that each family member visited.

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Reliability
The research team established interrater reliability for the behavioral measures. First, the undergraduate coders were trained and then practiced coding in the museum for about one month before any data were collected for the current study. After that time, each of four undergraduate coders was paired with a reliability coder (i.e., the faculty member on the project). They each independently observed one family unit at the same time and filled out the observation instrument. Thus, the observations for four families were used to calculate interrater reliability. For each family there were between 30 and 48 decisions, depending on the number of people in the family, on which to agree or disagree about which exhibit each person was in. The level of agreement for each pair of observers ranged from 87% to 96%. Disagreements were discussed. The students then observed the remaining 67 families. Two of the student observers were the first and second authors on this paper. Two other student observers collected data and their data collection work was their sole contribution to the project.

Coding
Exhibits were categorized post-hoc by gender-type by the three authors on this paper. We used the categorizations of Goble et al. (2012, p. 441) from their work in Head Start preschool classrooms regarding the types of activities in which boys and girls were observed to engage. This specific study was chosen as the basis of our categorization due to the clear descriptions of each gender-typed activity based upon their observations of the children in the classrooms and play areas. Our research team categorized the exhibits by the match between the activity noted by Goble et al. (2012) and the activity afforded by each exhibit, rather than the subjective type of play that might have been observed in the museum. For example, the cornhole exhibit in the museum was coded as “masculine” because Goble et al. (2012) had an activity of “balls” in their masculine category. We deemed that the way a beanbag is meant to be thrown into the cornhole was most like a ball being thrown into a hoop or just thrown on the play yard. There was no other activity in Goble et al.’s (2012) feminine or neutral categories that fit cornhole better than “balls.” It is possible that children could have engaged in pretend play with the cornhole materials but doing so would not have meant that cornhole would have been coded as neutral. Pretend play - neutral was categorized as neutral by Goble et al. (2012). To reiterate, the coding of the exhibits was based on the activity offered by each exhibit and not by the behaviors of the visitors at the exhibits. Interrater reliability revealed that, for the 22 exhibits in the museum, all three coders agreed on the gender typing for 68% of the exhibits, and two coders agreed on the gender typing for 100% of the exhibits. Disagreements were resolved via discussion. See Table 1 for which exhibits were categorized as feminine, masculine, and neutral.

Procedure
The museum was open Thursday through Sunday. The number of family units observed on each day were Thursday = 15, Friday = 11, Saturday = 18, and Sunday = 25. Observations took place between 11 a.m. and 4 p.m. Two student researchers were stationed in a central location in the museum. The researchers wore a T-shirt with the university insignia and they held a clipboard with the data collection forms. When a group of people who appeared to be together entered the museum, one of the researchers immediately recorded demographic information for each member of the unit and started a timer for observation. The gender of each visitor was categorized by the researchers based on the visitor’s clothing and hairstyle into female, male, or nonbinary. The researchers acknowledge that this approach to coding gender is biased. Researchers used time-sampling such that they observed the family for five 3-minute snapshots for a total of 15 minutes of observation. During the first 15 seconds of each snapshot, the researcher observed the members of the unit to see the exhibits they had chosen. The researcher took about one minute or less to record the exhibit each member was in. Then they waited approximately two minutes for the next snapshot to start. This was repeated for a total of five snapshots. All 71 families included in analyses stayed long enough to be observed for all five snapshots. Two other families were dropped from analyses because they left the museum before all five snapshots were recorded.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Museum Exhibits Coded Into Feminine-Stereotyped, Masculine-Stereotyped or Neutral Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feminine-Stereotyped Exhibits</td>
<td>Masculine-Stereotyped Exhibits</td>
</tr>
<tr>
<td>Arts and Crafts</td>
<td>Construction Zone</td>
</tr>
<tr>
<td>Grocery Store</td>
<td>Vehicles</td>
</tr>
<tr>
<td>Library</td>
<td>Kayaks</td>
</tr>
<tr>
<td>Farmer’s Market</td>
<td>Lincoln Logs</td>
</tr>
<tr>
<td>Theater</td>
<td>Car Carpet</td>
</tr>
<tr>
<td>Tree with Messages</td>
<td>Legos</td>
</tr>
<tr>
<td>Ribbon Weaving</td>
<td>Cornhole</td>
</tr>
<tr>
<td>Moveable Ice Cream Cart</td>
<td></td>
</tr>
</tbody>
</table>

Note. “It was possible for visitors to not be in an exhibit during a snapshot. They could be in-between exhibits, inside or outside. If that was the case, we identified their location with one of these locations.”
Results
Our research question asked about the extent to which museum visitors were drawn to exhibits that were stereotypically aligned with their gender. To test this question, we report our data in two ways. First, in order to directly compare our results with Herzog and Luria (1991), we report for children, during a 15-minute period, the percentage of boys and girls who visited three kinds of exhibits: feminine, masculine, and neutral. Next, we report the ways in which children and their caregivers moved about the museum. We followed them for 15 minutes and reported where they were in each of five 3-minute snapshots. Thus, for each snapshot we report the visitors’ presence at exhibits coded as feminine, masculine, and neutral, first across all visitors, and then disaggregated by age and gender.

To compare with earlier findings from the studies in the 1990s, we ran a Chi-Square test of independence comparing boys’ and girls’ visits at the wearable cars (i.e., to compare with Herzog and Luria’s automobile exhibit), the grocery (i.e., to compare to Herzog and Luria’s superette grocery exhibit), and the sand table (i.e., to compare with Herzog and Luria’s less gender-typed exhibit, the computer exhibit). MY Town did not have a computer exhibit or anything with a screen, so we chose the sand table, a neutral exhibit that involved hand manipulations similar to the hand manipulations on a computer keyboard. We found that boys and girls did not visit these exhibits equally often, $\chi^2 = 10.91$, $df = 2$, $p < .01$. Girls tended to visit the grocery (38% of 107 visits by girls) and the sand table (16%) more than the boys (29% and 9%, respectively, of 149 visits). The boys tended to visit the wearable cars (36%) more often than the girls (18%). These results replicated the findings of Luria and Herzog (1991).

We also examined the movement of the visitors around the museum. We wanted to know whether children and caregivers tended to stay at exhibits that were typed for their gender or whether they were likely to visit exhibits that were typed for a different gender or were neutral. Thus, we ran Chi-Square Goodness of Fit tests to see whether visitors visited the three kinds of exhibits (i.e., exhibits stereotypically for one’s gender, exhibits stereotypically for another gender, and neutral exhibits) during each snapshot. The null hypothesis for the Chi-Square Goodness of Fit test is that the frequency of visits to a particular kind of exhibit is no different from what would be expected by chance. For each snapshot, the expected frequency of visits at each of the three kinds of exhibits was 1/3 of the total number of visits. A significant Chi-Square meant that the number of visits at each kind of exhibit was different from the expected 1/3. Due to the large number of Chi-Square tests we ran, we used the Holm-Bonferroni correction to adjust the alpha level.

![Figure 1: The Percentage of All Visitors Who Visited Each Type of Exhibit by Snapshot](image1)

![Figure 2: The Percentage of Caregivers Who Visited Each Type of Exhibit by Snapshot](image2)

Note. Due to the large number of Chi-Square tests we ran, we used the Holm-Bonferroni correction to adjust the alpha level. We report the exact alpha level and each one was below the Holm-Bonferroni correction, thus, significant at that corrected level. In each snapshot, the Chi-Square Goodness of Fit test showed that visitors did not visit the three kinds of exhibits equally often. Snapshot 1, $\chi^2 (2, n = 228) = 10.61, p = .005$; Snapshot 2, $\chi^2 (2, n = 230) = 6.11, p = .037$; Snapshot 3, $\chi^2 (2, N = 220) = 17.19, p < .001$; Snapshot 4, $\chi^2 (2, N = 215) = 8.66, p = .01$; Snapshot 5, $\chi^2 (2, N = 209) = 10.06, p = .005$. In each snapshot, the Chi-Square Goodness of Fit test showed that caregivers visited the three different kinds of exhibits equally often in snapshots 1, 2, 4, and 5. Snapshot 1, $\chi^2 (2, n = 109) = 0.49, n.s.$; Snapshot 2, $\chi^2 (2, n = 108) = 2.2, n.s.$; Snapshot 4, $\chi^2 (2, n = 101) = 4.30, n.s.$; Snapshot 3, $\chi^2 (2, n = 98) = 8.60, p = .01$; Snapshot 5, $\chi^2 (2, n = 99) = 8.06, p = .02$. 
Gender Exhibit Choices

In addition, we report only tests that were statistically significant per the Holm-Bonferroni correction.

Across all visitors, the results revealed that, during each of the five snapshots, family members did not visit the three kinds of exhibits equally. They were most likely to visit exhibits typed for their own gender. Snapshot 1, \( \chi^2(2, n = 228) = 10.61, p = .005 \); Snapshot 2, \( \chi^2(2, n = 230) = 6.11, p = .037 \); Snapshot 3, \( \chi^2(2, n = 220) = 17.19, p \leq .001 \); Snapshot 4, \( \chi^2(2, n = 215) = 8.66, p = .01 \); Snapshot 5, \( \chi^2(2, n = 209) = 10.06, p = .005 \) (see Figure 1). We then disaggregated the results by age and tested the caregivers and the children separately. The caregivers and the children showed different patterns. The caregivers visited all three kinds of exhibits equally in three snapshots: Snapshots 1, 2, and 4. In the other two snapshots, caregivers appeared to visit neutral exhibits and exhibits typed for their gender more often than exhibits typed for a different gender, Snapshot 3, \( \chi^2(2, n = 98) = 8.60, p = .01 \); Snapshot 5, \( \chi^2(2, n = 99) = 8.06, p = .02 \) (see Figure 2). Conversely, the children visited all the exhibits equally in just one snapshot, Snapshot 5. In the other four snapshots, children appeared to visit exhibits typed for their gender more often than those typed for a different gender or neutral exhibits, Snapshot 1, \( \chi^2(2, n = 119) = 17.21, p \leq .001 \); Snapshot 2, \( \chi^2(2, n = 122) = 8.87, p = .008 \); Snapshot 3, \( \chi^2(2, n = 122) = 14.23, p = .001 \); Snapshot 4, \( \chi^2(2, n = 114) = 7.00, p = .03 \) (see Figure 3).

We then disaggregated the caregivers’ and children’s results by gender. With these Chi-Square tests of Goodness of Fit, we found that the male caregivers, female caregivers, and male children more often visited the three kinds of exhibits equally, and there were just one or two snapshots where they were drawn to some exhibits more than others. Male caregivers in Snapshot 3 appeared to visit neutral exhibits most often, \( \chi^2(2, n = 26) = 7.00, p = .03 \) (see Figure 4). Female caregivers in Snapshots 4 and 5 appeared to visit exhibits typed for their gender most often: Snapshot 4, \( \chi^2(2, n = 68) = 11.85, p = .005 \); and Snapshot 5, \( \chi^2(2, n = 66) = 10.09, p = .006 \) (see Figure 5). Male children in Snapshot 1 appeared to visit exhibits typed for their gender most often, \( \chi^2(2, n = 60) = 19.20, p \leq .001 \) (see Figure 6). Conversely, the female children in Snapshot 1 visited the three exhibits equally. Thereafter, they appeared to visit the exhibits typed for their gender most often, Snapshot 2, \( \chi^2(2, n = 61) = 12.72, p = .003 \); Snapshot 3, \( \chi^2(2, n = 61) = 19.31, p = .001 \); Snapshot 4, \( \chi^2(2, n = 55) = 17.60, p = .001 \); and Snapshot 5, \( \chi^2(2, n = 53) = 15.55, p < .001 \) (see Figure 7).

Furthermore, the family members differed from each other in terms of when during the visit they were drawn to exhibits typed for their gender and when they were drawn to exhibits typed for a different gender or neutral exhibits. Adult males visited all exhibits equally in Snapshots 1, 2, 4, and 5. It was in the middle of their...
visit, in Snapshot 3, that male caregivers were drawn to some exhibits more than others. Female caregivers visited all exhibits equally in Snapshots 1, 2, and 3, and then visited some exhibits more than others in snapshots 4 and 5. Boys visited masculine exhibits in Snapshot 1 and then visited all exhibits equally in snapshots 2–5. The opposite pattern was shown for girls where they visited all exhibits equally in Snapshot 1 and then spent time at some exhibits more than others in Snapshots 2–5.

**Discussion**

In this study, we observed families during their visit to a pop-up children’s museum in two different ways: we counted the number of female and male children who visited individual exhibits, and we followed family members over a 15-minute period to take note of the exhibits they visited during that time period. We counted visits at individual exhibits in order to see whether our results would replicate findings from the 1990s showing that boys and girls tended to be the most frequent visitors at exhibits that included activities that were directed toward their own gender (e.g., a grocery store for girls and cars for boys). In addition, we followed family members over a short period of time in order to test whether they tended to stay at exhibits typed for their gender or whether they visited all kinds of exhibits.

The results revealed that our data in 2019 replicated the findings from the 1990s. Specifically, Luria and Herzog (1991) found that the children they observed in Boston were more likely to visit exhibits aligned with their gender, and a smaller percentage of children chose exhibits that were not aligned with their gender. Our results were the same for children in Salinas. Gender

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**FIGURE 6**

**The Percentage of Male Children Who Visited Each Type of Exhibit by Snapshot**

<table>
<thead>
<tr>
<th>Snapshot</th>
<th>Exhibits Typed for One’s Gender</th>
<th>Exhibits Typed for a Different Gender</th>
<th>Neutral Exhibits</th>
<th>Expected % of Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70%</td>
<td>30%</td>
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<td>2</td>
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<td>4</td>
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<tr>
<td>5</td>
<td>30%</td>
<td>70%</td>
<td>0%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Note: The Chi-Square Goodness of Fit test showed that male children visited the three different kinds of exhibits equally often in snapshots 2, 3, 4, and 5. Snapshot 2, \( \chi^2 (2, n = 61) = 2.93, \) n.s.; Snapshot 3, \( \chi^2 (2, n = 61) = 1.02, \) n.s.; Snapshot 4, \( \chi^2 (2, n = 59) = 3.09, \) n.s.; Snapshot 5, \( \chi^2 (2, n = 57) = 2.21, \) n.s. Male children did not visit the three kinds of exhibits equally in Snapshot 1, \( \chi^2 (2, n = 60) = 19.20, p < .001. \)

---

**FIGURE 7**

**The Percentage of Female Children Who Visited Each Type of Exhibit by Snapshot**

<table>
<thead>
<tr>
<th>Snapshot</th>
<th>Exhibits Typed for One’s Gender</th>
<th>Exhibits Typed for a Different Gender</th>
<th>Neutral Exhibits</th>
<th>Expected % of Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70%</td>
<td>30%</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>60%</td>
<td>40%</td>
<td>0%</td>
<td>20%</td>
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<tr>
<td>3</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>40%</td>
<td>60%</td>
<td>0%</td>
<td>20%</td>
</tr>
<tr>
<td>5</td>
<td>30%</td>
<td>70%</td>
<td>0%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Note: The Chi-Square Goodness of Fit test showed that female children were drawn to some exhibits more than others in snapshots 2, 3, 4, and 5. Snapshot 2, \( \chi^2 (2, n = 61) = 12.72, p = .005; \) Snapshot 3, \( \chi^2 (2, n = 61) = 19.31, p < .001; \) Snapshot 4, \( \chi^2 (2, n = 59) = 16.06, p < .001; \) Snapshot 5, \( \chi^2 (2, n = 53) = 15.55, p = .001. \) Female children visited the three kinds of exhibits equally in Snapshot 1, \( \chi^2 (2, n = 59) = 2.17, \) n.s.
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schema theory (Martin & Halverson, 1981; Martin et al., 2002) can account for these results. At the same time, different results were revealed when we analyzed the visits at exhibits over time. That is, when we observed family members over time, the results revealed that adult men and women, as well as boys, most of the time visited all kinds of exhibits during a 15-minute period. Conversely, the girls we observed tended to spend most of their time throughout the 15 minutes at exhibits that only included feminine activities. In other words, most of the time the adults and the boys were just as likely to play on the make-believe road and drive the wearable cars as they were to play in the grocery or at the sand table, whereas the girls were more likely to be at certain feminine exhibits, such as the library, the grocery, and the arts and crafts table.

In addition to the consistencies and differences with previous work in museums, these results show some similarities and differences with previous work on children's play more generally. Goble et al. (2012) found that preschool boys demonstrated less gender-typed play when their teacher was nearby, and similarly we found that the boys, at a museum with their families, demonstrated a preference to play at all kinds of exhibits rather than focus on only those exhibits typed for their gender. One of the ways in which our findings differ from previous work is that the girls, more than boys, seemed to be attracted to gender-typed exhibits. Other work on toys found that girls tended to be more open to other-gender toys, and boys were more likely to maintain gendered norms for toy selection (e.g., Weisgram et al., 2014).

It is not clear why boys and girls showed different patterns of visits to the exhibits. In more snapshots, boys visited all kinds of exhibits, whereas girls tended to focus on feminine exhibits. In other words, the boys more than the girls were more likely to explore nongender stereotyped activities. It is possible that the museum experience facilitated a certain kind of freedom for both boys and girls, and the freedom was realized differently for each group. For many of the girls, it meant that they did not have to feign interest in masculine activities. For many of the boys, it meant that they did not have to eschew feminine activities in the ways they might in school with same-gender peers. To be clear, not every boy and girl showed these patterns. The majority of the girls and boys showed these patterns, and others did not behave according to these patterns.

A second possibility for our findings is that the exhibits that were typed for females might have been the most interesting or novel exhibits, and the exhibits typed for males might not have been as interesting or novel. After the first snapshot where boys were attracted to exhibits typed for males, they might not have seen any other gender-typed exhibits that were as exciting. Further, for the girls, it is possible that the exhibits typed for males as well as the ones that were neutral were not appealing, beyond the fact that they included stereotypically male activities.

Observing children and their families in the field is a strength of this study. We were able to observe the behavior of families in a real-life setting and the participants could be observed with few demand characteristics affecting the results. Our study's findings may generalize to other children's museums because of the field design method, however, caution is warranted, and researchers should attend to the specific location and population served by any museum. The field design method has been employed by other researchers whose aim was to examine child development in an environment outside the home, school or laboratory, and it comes with special rewards and challenges (Callanan, 2012).

The field setting indeed made for some challenges to our observations. One challenge is that we were observing a family activity where family members most likely influenced each other's choices about which exhibits to visit. Early on we attempted to code who appeared to be directing the action, but we could not reach a good level of agreement across observers and so we abandoned that code. Another limitation to the field observation and our desire to not interact with the visitors was that we guessed visitors' gender. To protect visitors' identities and reduce concerns about anonymity in a time when immigration raids were feared, we did not ask them questions about how they would characterize themselves in terms of social class, cultural background, or gender. Instead we observed from afar and made guesses about visitors' gender from dress and hairstyle. This is admittedly crude. Furthermore, we coded the exhibits according to stereotypic, gendered preferences, albeit preferences that Goble et al. (2012) observed in children's play in a Head Start in the early 2000s.

Additionally, we acknowledge the limitation of having two of the three authors of this paper serve as observers for data collection as well as coders for the gender of the exhibits. The observers noted which exhibit each family member was in during each snapshot. For those times when visitors appeared to be near two exhibits, it is possible that the observer could have placed them in the exhibit that aligned with the observer's biases about where people of different genders should spend their time. At the same time, we did not code the exhibits as aligning with one gender or another until after we had collected all of our data. Thus, we did not know when we were observing which exhibit would be coded as feminine, masculine, or neutral. Categorizing the exhibits post-hoc might have reduced biases during
data collection, but doing so after the fact might have introduced other biases. That is, after observing the visitors for two months, their actions in the exhibits could have influenced the way we coded the exhibits as feminine, masculine, or neutral. This possibility is reduced by the fact that we closely followed the categorizations of Goble et al. (2012) for activities that were masculine, feminine, or neutral and not our own ideas for gendered activities.

Another limitation is that we did not account for the type of play that the children actually engaged in while interacting with the exhibits. Rather, we only recorded the exhibit they visited. Our choice to observe visitors from a respectful distance resulted in fewer opportunities to clearly document their play and conversation. It is possible that children's play in the exhibits was gendered, even if they were in an exhibit that was coded as not aligning with their gender. Indeed, Kremer and Mullins (1992) found that, although there was no difference in the number of boys and girls who visited the different exhibits, the researchers did observe differences in the girls' and boys' behavior at the exhibits. For example, at a water jets exhibit, 28% of boys and 1% of girls pretended the water jets were guns. At an animal lab exhibit, 35% of girls and 5% of boys showed "nurturing behavior" toward the baby chicks.

This study provided evidence that children's museums can be a space for children to play and explore in different ways. Further studies on the topic should include information about the type of play that children were engaging in within the exhibits in order to build on the work of Kremer and Mullins (1992). Such studies might clarify the differences we found in boys' tendency to explore across different gender-typed exhibits and girls' tendency to focus on own-gender-typed exhibits. In addition, it would be nice to see experimental studies that manipulate different aspects of the exhibits in the museum, similar to those done with toys (e.g., Weisgram et al., 2018) where color is manipulated to test whether it is the color or the toy's activity that entices different children to play with it. For example, what if the wearable cars exhibit had included a problem that needed to be solved in addition to the opportunity to go fast around the track? Would such an addition have enticed different children to engage with the exhibit compared to when there was no problem to solve?

In conclusion, although there have been some advances in gender equity in American society since 1990, including the first ever female vice-president of the United States elected in 2020, there is more work to be done. Children's museums have a unique position as informal learning spaces with possibly less red tape to go through to institute changes compared with formal, public schools. Studies such as ours and others (Fasoli, 2015) that followed visitors throughout their visit bring more information to exhibit designers about how visitors are engaging with the museum as a whole. Knowing that boys visited all kinds of exhibits and girls seemed to focus on those that included activities that were stereotypically associated with their own gender is a first step to thinking about how to broaden the experience for visitors. For example, Greenfield (1995) suggested that including activities appealing to "both sexes," (p. 934; we would update her words to say "appealing to people across the gender spectrum," in the same exhibit with docents to guide the children's actions, as suggested by Greenfield (1995) as well as Kremer and Mullins (1992), is one way to increase the chances that everyone will see an opportunity to engage with all the exhibits. Including everyone and increasing their opportunities are both parts of the big puzzle of how we increase the diversity of teams of people focused on solving the world's big problems.

There is much work to be done to understand the preferences of children and the ways in which parents, peers, and society influences those preferences. In this study and in others, gender was considered from a binary perspective. It is our goal to move toward a less binary framework and toward a more open approach to children's preferences for and play in museum exhibits. Doing so may open opportunities for all genders to have equitable experiences, develop well-rounded skill sets, and pursue interests that spark their passions as unique individuals.

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