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Children's Memory for and Judgment of Stereotypical and Counter-Stereotypical Favorite Color Information

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Abstract

Pink is for girls and blue is for boys, so says the traditional adage. But what about the boy who likes pink, or the girl who likes blue? This study aimed to assess the effect of color stereotypes on children's memory and judgment. Children from two preschools were told the favorite colors of stimulus children, then asked to distribute colored toys to these children, and to verbally recall their favorite colors. Children more accurately remembered a male's favorite color when it violated color stereotypes, whereas they remembered a female's favorite color equally in stereotypical and counter-stereotypical situations. Additionally, when given counter-stereotypical favorite color information, children recalled more favorite colors than they correctly distributed. Thus, results showed that mere violation alone may not be sufficient to make counter-stereotypical preferences memorable; a violation must be particularly abnormal in order to be salient. Moreover, even when counter-stereotypical preferences are remembered, they are likely to be ignored in favor of traditional stereotypes by other children.

Although Americans are increasingly thinking of sex stereotypes as old-fashioned, sex-stereotypical thinking remains pervasive, especially in young children. These stereotypes represent a major filter through which children see the world, affecting how children view what is appropriate for themselves and others. Gender stereotypes have been found to impact children's memory for information about their peers, and can cause children to judge their peers based on stereotypical ideas about what is appropriate for each sex. Although increased social awareness is breaking down traditional sex roles and associations, it may be more accurate to think of this effect resulting from maturation of thought in adulthood, rather than the abolishment of the existence of traditional stereotypes in American culture. In fact, many adults are far from discouraging when it comes to sex stereotypes in infants and children in one respect in particular: color. Many adults encourage children, intentionally or subconsciously, to prefer colors traditionally attributed to their sex, and this encouragement leads to children stereotyping colors based on sex. This tendency to stereotype colors may manifest itself in children in three ways: first, a preference for sex-appropriate colors of clothing, toys, and other possessions; second, a propensity to remember stereotypical color information; and third, a predisposition towards judging other children based on their color preferences.

What colors are stereotypically attributed to each gender?

Most people are familiar with the adage that "blue is for boys and pink is for girls." When phrased "blue is for men, pink is for women," this proverb sounds less familiar. Clearly, although blue is a perfectly reasonable color for adult women to wear, and pink is becoming increasingly acceptable, even trendy, in adult male clothing, this acceptance is purely an adult phenomenon. In other words, although parents feel

comfortable dressing themselves in non-sex-stereotypical colors, the culture of dressing infants and young children in blue for boys and pink for girls is still quite alive. In an observation of infants in a shopping mall in Long Island, New York, Shakin, Shakin and Sternglanz (1985) found that 75% of girls had some pink on their clothing, as compared to 0% of boys, while 79% of boys had some blue on their clothing, as compared to 8% of girls. Another study compared stereotypes in the clothing, accessories, and toys of children up to two years old and found that girls more often wore pink or multicolored clothing and had more pink pacifiers, whereas boys wore more blue, red, and white clothing and had more blue pacifiers (Pomerleau, 1990). Indeed, children continue to wear sex-stereotypically colored clothing well past infancy and into the age where they are independent enough to pick out their own clothing and dress themselves. An observation of the in-store behavior of children and parents shopping for clothing found that while the child's impression of the color influenced whether the parent purchased the clothing item, parental evaluation of color had no significant impact on the purchase decision (Darian, 1998). It is possible that, even after gaining independence, children are still susceptible to the preferences of their parents; however, it is more plausible to assume that children are choosing to wear sex-typed clothing.

In addition to affecting clothing choice, sex-typing by color is also seen in toys. Cherney, Harper & Winter (2005) found that color, but not functionality, was a major factor when children were deciding whether a gender-neutral or gender-ambiguous toy was a "boy toy" or a "girl toy." In fact, one study found that children ignore a toy's attractiveness almost completely when the toy is seen as stereotyped for the other sex. "Even with very attractive toys, children liked toys less if they were labeled as being for

the other sex, and expected other girls and boys to do the same," (Martin, Eisenbud & Rose, 1995). Although Martin, Eisenbud, and Rose were explicit in telling the children which toys were for girls and which were for boys, it is not farfetched to conclude that children may ignore otherwise attractive toys due to being perceived as "for the other sex" entirely because of their color.

Do children's color preferences align with traditional color stereotypes?

It is of interest to note that few studies have shown that children have sex-dimorphic color preferences. A study done by Eysenck (1941) found that, in general, children preferred blue. Several studies have shown that children prefer red the most, overall (e.g., Zentner, 2001; Bourgeois-Bailetti & Cerbus, 1977; Palmer, 1973; Burkitt, Barett & Davis, 2003). These are significant results because they show that children, on the whole, prefer a color that is neither pink nor blue. Of the previously mentioned studies, only Burkitt, Barett, and Davis (2003) found evidence for sex-dimorphic color preferences, with girls more often preferring pink, purple, and red, and boys preferring black, blue, brown, green, and white. It is possible that the lack of sex-dimorphic preferences was due to age effects; younger children are not as knowledge about sex-stereotypes and thus are less likely to have sex-stereotypical color preferences. Of the previously listed studies, most used young children. Only the Burkit, Barett, and Davis study and the Palmer study tested 8-10 year old children in addition to preschoolers, and only Burkit et al. (2003) found evidence of sex-dimorphic preferences. Thus, it is difficult to determine whether the lack of sex-dimorphism that was found in many of the studies was a product of participant age, or resulted simply because children do not have sex-dimorphic color preferences.

What do children know about color stereotypes?

Although children may not always display sex-stereotypical preferences, several studies have shown that they do have knowledge of stereotypical colors that is consistent with adult stereotypes. Additionally, while pink and purple are consistently rated as stereotypically female, and blue and green are consistently rated stereotypically male, it is often unclear what the less pervasive stereotypes for other colors are. To test children's knowledge of color stereotypes, Picariello, Greenberg, and Pillemer (1990) showed children colored toy pigs and asked them to decide which were girl pigs and which were boy pigs. They found that "children's sex designations were highly consistent with adult stereotypes," with light pink, bright pink, and lavender being the most feminine, and navy blue, brown, and maroon the most masculine. On the other hand, Chun (2005) found that children thought maroon was a gender-neutral color, along with red and white. According to her study, more than 75% of children classified orange, blue, green, and black as "for boys," and pink, purple, and yellow as "for girls." Some of these results are contrary to a study by Cherney, Harper, and Winter (2005), which found that boys thought yellow, orange, white, and red were "boy colors" and girls thought the same colors were "girl colors." Because the children in that study were not explicitly told they were allowed to choose a "boy or girl" category, children may have been more likely to sex-type a color they would have ordinarily thought of as gender-neutral. Thus, because both boys and girls self-identified with those colors, they are acceptable for both sexes and so, yellow, orange, white, and red were considered gender-neutral. Clearly there are some colors for which the sex-attribution is unclear – maroon, yellow and orange – as well as colors that have no sex-attribution – red and white.

Learning of stereotypes via schemas

How do children learn which colors – or items, roles, or activities – are associated with each gender? How do adults remember stereotypes? Martin and Halverson (1981) propose that stereotypes – in particular, sex stereotypes – are not due to faulty processing or "bad thinking," but are a normal cognitive process and are organized using a mental structure called a schema. They define schemas as "naïve theories that guide information processing by structuring experiences, regulating behavior, and providing bases for making inferences and interpretations" (p. 1120). Children use gender schemas to organize information about each sex by actively looking for and paying more attention to gender-related information in their environment. This information influences how children interact with objects as well as how they behave towards people and attribute to them traits and roles (Chiu et al, 2006). According to Martin and Halverson, children add information to their schema according to the flow chart in Appendix A, Figure 1. For example, when a girl encounters a novel object, such as a blue stuffed bear, the first question she unconsciously asks herself is, "Is this relevant to me?" In the case of sex-typed objects, the answer is yes, so she asks herself, "Is this 'for boys' or is it 'for girls'?" Martin and Halverson suggest that these sex-labels are provided by outside sources, such as adults, other children, or the media. The girl, after deciding that the blue bear was self-relevant, would decide that the stuffed toy was 'for boys' based on the color, and thus put it into the category "not for me" and avoid it or forget about it. A pink bear would be put in the category "for me" and further explored. It is in this way that children categorize objects as gender-relevant or gender-irrelevant. Martin and Halverson propose this schema is called the "in-group-out-group" schema, and consists of "all general

information children need to categorize objects, behavior, traits, and roles as being either for males or for females" (p. 1121). This is in contrast with the "own-sex" schema, which consists of detailed information about things categorized as "for me" in the in-group-out-group schema. In the context of this paper, the in-group-out-group schema is most relevant.

Schemas and memory

We have seen that children use sex-stereotypes when deciding which toys, clothes, or other objects to play with, wear, or use. However, stereotypes also influence the information that children remember. Several studies have shown that children remember objects relating to their own gender much better than objects labeled as for the other gender (e.g., Cherney & Ryalls, 1999; Signorela, Bigler & Liben, 1997). This result is consistent with the model of sex-stereotypes proposed by Martin and Halverson (1981). Objects labeled "for me" are remembered whereas objects labeled "not for me" are forgotten. This finding has been clearly demonstrated in the literature; however, it remains unclear how children's memory is affected by stereotype-incongruent information.

What do children remember when given information that goes counter to their schemata, (e.g. that a boy's favorite color is pink). Schema theory presents two contradicting hypotheses. The first possibility is that counter-stereotypical information is ignored (Neisser, 1976), or reinterpreted (Crocker, Hannah & Weber, 1983). "Schemata often guide information processing such that information congruent with or confirming of, existing expectations will be preferentially encoded and retrieved from memory, in comparison with schema-disconfirming information," (Stangor & McMillan, 1992, p.

43). To continue the example, when a boy is told that another boy's favorite color is pink, he may ignore this information and continue to think that his favorite color is blue, or another stereotypically male color, or he may reinterpret the information and assume that the other boy's favorite color is red, which is similar to pink but more masculine. In either case, the boy no longer remembers that the other boy's favorite color is pink. He would be much more likely to remember another boy's favorite color if it was blue, or green.

The alternate hypothesis is that schema-incongruent information is particularly salient and thus more likely to be remembered than even schema-congruent information. This hypothesis is derived from the Schema Pointer Plus Tag (SP+T) model, in which information that is incongruent with expectations is "tagged," and encoded in a different location than schema-consistent information (Stangor & McMillan, 1992). According to this model, other children would be more likely to remember a boy's favorite color if it was pink rather than blue. Although the schema model and the SP+T model disagree with respect to whether schema-inconsistent or schema-consistent information is more memorable, they converge on the idea that information related to social schemata is remembered better than schemata-irrelevant information. This suggests that children who prefer gender-neutral colors are likely to have their favorite colors forgotten in either case.

Several studies have been done to test how children interpret and remember stereotype-incongruent information, although few, if any, relate specifically to color. Martin and Halverson (1983) showed children pictures of males and females doing stereotypic and counter-stereotypic activities. The children were later asked if they

remembered someone doing each activity, and if so, if the person doing it was a male or a female. They found that children, when presented with sex-inconsistent information, changed the information to be sex-consistent by changing the sex of the actor. In addition, "children were extremely confident about those memory distortions." Another interesting result of the Martin and Halverson study was that pictures of stereotype-consistent activities were remembered more often than pictures of stereotype-inconsistent activities when the actor was female, and pictures of stereotype-inconsistent activities were remembered more often when the actor was male. They suggest that this finding occurred because violation of male stereotypes was perceived as more novel and salient than violation of female stereotypes. In a similar study, Cordua, McGraw, and Drabman (1979) found that children changed the role, not the actor, by converting reversed roles into stereotypical roles. Other studies also appear to favor the hypothesis that children remember stereotype-congruent information more often than stereotype-incongruent information (e.g, Fyock & Stangor, 1994; Ruble & Stangor, 1986). Conversely, in a meta-analysis of experiments done on the influence of social expectations on memory for information, Stangor and McMillan (1992) found that the tendency to report expectancy-congruent information as having been seen was due to response bias. In other words, guessing was overriding preferential encoding of incongruent information. When response bias was taken into account, Stangor and McMillan found an overall tendency to remember expectancy-incongruent information. Clearly, there is a relationship between stereotype-consistency of information and memory, but it is uncertain what this relationship is.

The role of color stereotypes in children's perceptions and judgments of peers

In addition to influencing what objects children interact with and what information children remember, sex-stereotypes can cause children to judge others based on the colors they favor or wear. Picariello, Greenberg, and Pillemer (1990) found that "preschoolers use color when attempting to identify another's sex." They also found that, when another child's sex is known, their clothing color influences predictions about their behavior, preferences, and attitudes. In fact, one of the children referred to the boy wearing pink as "the weirdest one." Studies have found that preschoolers used sex-role oriented thinking to justify their decisions about what other children would like and dislike (Eisenberg, Murry, & Hite, 1982). It is possible that when children's preferences go against these preconceived notions, those children are judged as "weird" or "different." This effect of stereotypes is also seen in adults. Deaux and Lewis (1984) found that when adults were given stereotypical or reverse-stereotypical information, they made stereotype-consistent inferences about appearance, personality, and behavior. It is evident that both children and adults with counter-stereotypical preferences are likely to be stigmatized by their peers.

The present study examined children's memory for and reaction to expectancy-congruent versus expectancy-incongruent information about other children's favorite colors. Children were given and asked to remember either stereotype-consistent or stereotype-inconsistent information about four stimulus children's favorite colors. After a short task, they were asked to distribute colored toys to these children, and then tested on their memory of the favorite colors.

The purpose of this study was to determine how children use schemata to remember stereotyped information and how this information affects children's judgments of their peers. Previous research suggests the following hypotheses: (a) children will remember stereotyped – both stereotypical and counter-stereotypical – colors more often than neutral colors, (b) children will remember stereotypical colors more often than reverse stereotypical colors, and (c) children will ignore favorite color information in favor of stereotype-congruent information when distributing toys.

Method

Participants

A total of 40 participants were recruited from two different preschools: the Children's School at Carnegie Mellon University in Pittsburgh, Pennsylvania, and the B'nai Israel preschool in Rockville, Maryland. Participants were members of the 3-year-old classroom (three boys, six girls; age range 44-51 months, $M = 47$), 4-year-old classroom (five boys, six girls; age range 49-58 months, $M = 53$), or the kindergarten classroom (11 boys, nine girls; age range 60-65 months, $M = 62$). Participants were from predominantly white, middle-class backgrounds. Half of the girls and half of the boys were randomly assigned to the experimental (stereotype-inconsistent) condition, and the other half participated in the control (stereotype-consistent) condition. Half of the girls and half of the boys in each condition (experimental and control) were also randomly assigned to be in one of two neutral conditions (red or white). All participants were treated according to APA ethical guidelines.

Materials

Materials included 12 two-inch colored pom poms, of which four represented stereotypically feminine colors, four represented stereotypically masculine colors, and four represented gender-neutral colors. Colors were pre-selected based on survey results of undergraduate students at Carnegie Mellon University. Fifty adults (24 male and 26 female) provided independent ratings of 20 colors on a 5 point scale (1 = very masculine, 5 = very feminine). The four colors identified as most feminine (hot pink, light pink, dark purple, and light purple), most masculine (dark blue, neon blue, dark green, and neon green) and neutral (red, white, yellow, and orange) were selected for the study.

In order to create the stimulus children to be used in the study, four black and white photographs of Caucasian children (two male and two female), approximately age five, were printed in on cardstock on a Canon PIXMA iP90 printer and attached to a white box constructed from cardstock. Photographs were headshots selected from the Face and Gesture Recognition Research Network (FG-NET) Aging Database.

Design

This experiment utilized a 2 (participant gender) x 2 (stereotype condition) x 2 (neutral condition) between-subjects design. The first factor, participant gender, had two levels: male and female. The second factor, stereotype condition, had two levels: stereotypical-consistent versus stereotype-inconsistent color preferences. The third factor, neutral condition had two levels: in the red condition, a girl liked red and a boy liked white, and in the white condition, a girl liked white and a boy liked red. The dependent variables included the number of correct recall responses, and the number of pom poms correctly distributed.

Procedure

For participants recruited from the B'nai Israel preschool, informed consent was obtained via letters to the parents. Only children with complete consent forms participated. Children at the Children's School have blanket consent to participate in all studies performed there. Participants were randomly assigned to be in either the stereotype-consistent or stereotype-inconsistent group. Participants were tested individually in a quiet room. The experimenter showed the participant the photographs of the four children and explained that the four children were friends and liked a lot of the same things but also liked different things. The participant was told that the four children liked to play with the same toys, but they all liked different colors. The experimenter then told the participant the favorite color of each child. In the stereotype-consistent group, one of the male children liked blue and one of the female children liked pink. In the stereotype-inconsistent group, one of the male children liked pink and one of the female children liked blue. In both groups, the remaining girl and boy liked white and red. Whether the girl or boy preferred red or white was counterbalanced for each condition, so that for half of the participants, the girl's favorite color was red and the boy's favorite color was white, and for the other half of the participants, the girl's favorite color was white and boy's favorite color was red.

After hearing the favorite color information, the participant was told that the four children would like help completing a puzzle. This served as a filler task and took approximately eight minutes. After the participant finished the filler task, the experimenter removed the puzzle and put a box of colored pom poms on the table. She

told the participant that the four children wanted to play with these new toys, but they needed help distributing them. The participant was asked to "give out the toys one at a time so that each friend gets the colors you think they would like best." After the participant finished distributing the pom poms, he or she was asked what each child's favorite color was. The participant was then thanked for his or her participation and sent back to the classroom.

Results

In order to fully explore both independent variables, data were analyzed in terms of recall, distribution, and the relationship between recall and distribution. Distribution was further split into distribution accuracy and distribution of individual colors. Recall and distribution accuracy measures were used to test the hypotheses that a) children would remember stereotypical colors more often than reverse stereotypical colors, and b) children would remember stereotyped favorite colors (such as pink and blue) more than neutral favorite colors (such as white and red). The relationship between recall and distribution accuracy was measured to determine whether children neglect favorite color information, despite remembering it, when faced with information counter to their expectation. An alpha level of .05 was used for all statistical tests.

Recall of Favorite Colors

Recall Accuracy of All Colors

The number of correct favorite color responses (out of four) was measured for each participant, then divided by four to get a percentage correct. This percentage was used as the measure of recall accuracy. In order to determine how participant gender, stereotype condition (stereotypical versus reverse stereotypical), and neutrality (red

versus white) affect recall accuracy, a 2 x 2 x 2 univariate ANOVA was performed. This analysis revealed no significant main effects or interactions of any of the measured variables (see Appendix, Table 1). Thus, none of the manipulated variables had any effect on participants' recall of the stimulus children's favorite colors.

In order to further explore the accuracy of participants' recall, participants' responses to individual stimulus children were analyzed. A boolean variable was created for Andrew (the boy who liked either blue or pink), which indicated whether each participant got Andrew's favorite color correct or incorrect (see Figure 1). A similar variable was created for Debbie (the girl who liked either pink or blue; see Figure 2). Pearson's Chi-Square analyses were performed to determine whether either of these variables were independent of the stereotype condition; however, neither were significant: $\chi^2(1, N = 40) = 2.558$, $p = .110$, and $\chi^2(1, N = 40) = .114$, $p = .736$ respectively. Thus, for both Andrew and Debbie, whether or not participants accurately remembered their favorite color was independent of whether the participant was in the stereotypical or reverse stereotypical condition.

Figure 1: Participants' Recall of Andrew's Favorite Color

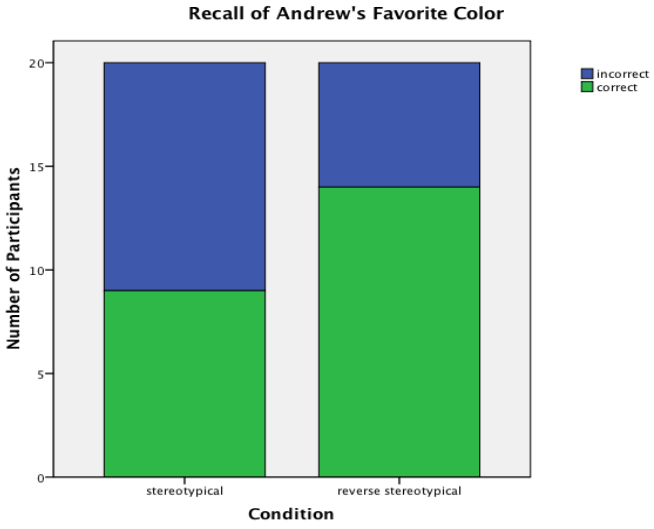
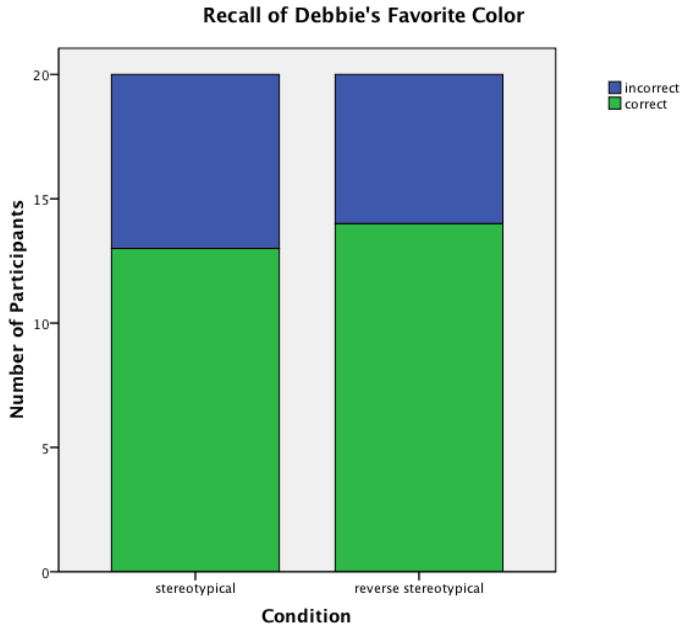


Figure 2: Participants' Recall of Debbie's Favorite Color



Recall of Stereotyped Versus Neutral Colors

To determine whether children are more likely to remember stereotyped color information than neutral color information, the recall accuracy measure was split into two variables, stereotyped color accuracy and neutral color accuracy, and a paired samples *t* test was performed. In this discussion, stereotyped colors are colors that are stereotypically attributed to either gender (such as blue and pink), as opposed to colors that are considered gender-neutral (white and red). The *t* test revealed that, across both conditions and genders, children more accurately recalled stereotyped information (M = 62.50%, SD = 40.43%) than neutral information (M = 51.25%, SD = 38.38%). This effect was marginally significant: $t(39) = 1.651$, $p = .107$. Further *t* tests performed on stereotypical and reverse stereotypical data individually revealed that only the reverse stereotypical group remembered stereotyped colors significantly more often than neutral colors (reverse stereotypical group: $t(19)$ 2.131, $p = .046$, stereotypical group: $t(19) = .000$, $p = 1.00$; see Table 3).

Table 3: Recall of Stereotyped and Neutral Colors across Gender

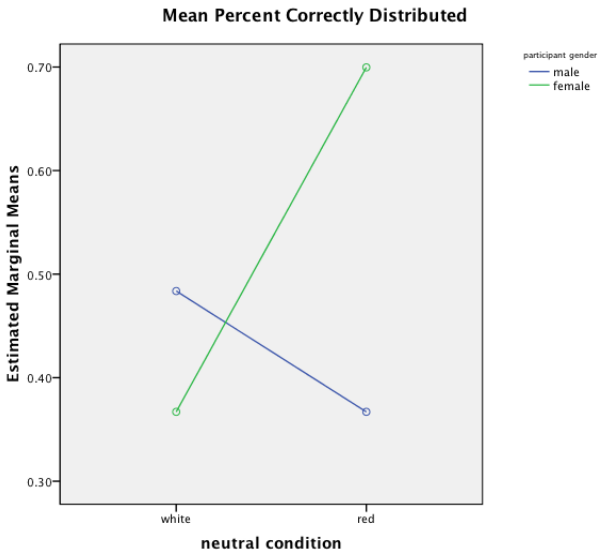
	Stereotyped Color Accuracy		Neutral Color Accuracy	
	M	*SD*	*M*	*SD*
Reverse Stereotypical Group	70.00%	37.70%	47.50%	38.00%
Stereotypical Group	55.00%	42.61%	55.00%	39.40%

Distribution of Pom Poms

Distribution Accuracy of All Colors

Distribution accuracy was measured as a percent of pom poms correctly distributed out of six. Because there were two pink pom poms and two blue pom poms, a participant who distributed both pinks, for example, to the correct stimulus child received two points, while a participant who distributed only one received only one point. In order to determine how participant gender, stereotype condition (stereotypical versus reverse stereotypical), and neutrality (red versus white) affect how accurately children distributed the pom poms, a 2 x 2 x 2 univariate ANOVA was performed on the distribution accuracy measure. According to this ANOVA, the only variable that significantly affected distribution accuracy was the interaction between the neutral variable and the participant gender ($F(1,32) = 7.879$, $p = .008$, see Figure 3). Females in the red group distributed the pom poms significantly more accurately than females in the white group, whereas males in the white group were more accurate than males in the red group. Means and standard deviations can be found in Table 2 (see Table 1 for F and p values).

Figure 3: Participant Gender and Neutral Condition Interaction



Distribution of Individual Colors

Pearson Chi-Square analyses were performed for each of the twelve colors in order to determine whether the gender each participant distributed each color pom pom to was independent of whether the participant was in the stereotypical or reverse stereotypical condition. Out of the twelve total colors, only three (dark pink, light pink, and dark purple) were significantly more likely to be distributed to one gender over the other. The Chi-square analyses for the remaining colors revealed no significant relationship between stereotype condition and distribution of pom poms (see Table 4).

Female colors. The relationship between stereotype condition and whether the participant gave the stereotypically-female pom poms to a male or female stimulus child was significant in the case of dark pink, and marginally significant for both light pink and dark purple, but did not reach significance in the case of light purple (see Table 4). Thus, participants in the stereotypical group were more likely to give three out of four stereotypically-female colored pom poms to a female stimulus child, but participants in

the reverse stereotypical condition were equally or more likely to give these colors a male stimulus child (see Appendix B, Figures 4-7).

Male colors. The majority of participants gave the dark blue pom pom to the male regardless of condition, although more children in the reverse stereotypical condition gave dark blue to a female than children in the stereotypical condition (see Appendix B, Figure 8). Children in the stereotypical condition correctly gave neon blue to a male the majority of the time, and children in the reverse stereotypical condition correctly gave neon blue to a female approximately the same amount of times, although this relationship was not significant (see Appendix B, Figure 9); participants in both groups gave the neon blue pom pom to the incorrect gender almost as often they gave it to the correct gender stimulus child.

Participants distributed the dark green pom pom to a male stimulus child slightly more often than a female child (see Appendix B, Figure 10). They were more likely to give dark green to a boy in the reverse stereotypical condition, but equally likely to give to a male or female in the stereotypical condition. Participants distributed neon green to a male stimulus child across both conditions (See Appendix B, Figure 11).

Neutral colors. Participants in all conditions were approximately equally likely to give the red and yellow pom poms to a male or female (see Appendix B, Figures 12, 14). They were more likely to give the orange pom pom to the male in the stereotypical condition and to the female in the reverse stereotypical condition, but this effect was not significant (see Appendix B, Figure 13). Although white was intended to be a neutral color, the number of participants that gave the white pom pom to a male was double the number that gave it to a female (see Appendix B, Figure 15). This effect was consistent

across both conditions.

Table 4: Distribution of Individual Colors

	$\chi^2(1, N = 40)$	*p*
Dark pink	2.667	.102
Light pink	8.640	.003
Dark purple	2.849	.091
Light purple	.440	.507
Dark blue	.417	.519
Neon blue	.902	.342
Dark green	.404	.525
Neon green	.107	.744
Red	.100	.752
Orange	1.616	.204
Yellow	.100	.752
White	.000	1.000

Discrepancy Between Recall and Distribution Accuracy

In order to determine whether children ignored the favorite color information, despite remembering it, when distributing the pom poms, a paired samples *t* test was performed between the following variables: recall accuracy and distribution accuracy. Overall, children recalled approximately 56.88% (*SD* = 33.00%) of the stimulus children's favorite colors, but distributed only 47.93% (*SD* = 27.74%) of the pom poms correctly. The paired samples *t* test indicated that this was a significant difference: $t(39) =$

-2.564, $p = .014$. Combining across both conditions and participant genders, children recalled significantly more favorite colors than they distributed.

To explore the effect of condition (stereotypical versus reverse stereotypical) and participant gender on this divergence, paired samples *t* tests were performed on the data, separately by condition. When considering only the data from the stereotypical group, the incongruity between recall and distribution accuracy becomes insignificant: $t(19) = -.925$, $p = .367$, with the mean recall accuracy at 50.00% ($SD = 36.81\%$), and mean distribution accuracy at 50.02% ($SD = 27.55\%$). The discrepancy becomes highly significant when considering only the data from the reverse stereotypical group: $t(19) = -2.941$, $p = .008$. The mean recall accuracy for the reverse stereotypical group was 58.75% ($SD = 29.55\%$), while the mean distribution accuracy was only 45.85% ($SD = 28.49$). Across both conditions, the difference for female participants was only marginally significant ($t(19) = -1.958$, $p = .065$), and was not significant for male participants ($t(19) = -1.647$, $p = .116$). For the means and standard deviations, see Appendix B, Table 1.

Table 5: Recall and Distribution Accuracy for Male and Female Participants Across Condition

	Recall Accuracy		Distribution Accuracy	
	M	*SD*	*M*	*SD*
Female	62.50%	29.80%	53.33%	26.23%
Male	51.25%	35.80%	42.53%	28.82%

Further breaking the data down and performing paired samples *t* tests on male stereotypical, male reverse stereotypical, female stereotypical, and female reverse

stereotypical data separately reveals that the discrepancy between recall and distribution performance is only significant for males in the reverse stereotypical group (see Tables 6, 7). In other words, only the males in the reverse stereotypical group were significantly more accurate at recalling favorite color information than distributing the correctly colored pom poms.

Table 6: Recall and Distribution Accuracy for Both Genders and Conditions

	Recall Accuracy		Distribution Accuracy	
	M	*SD*	*M*	*SD*
Female Stereotypical	65.00%	33.75%	56.70%	27.39%
Male Stereotypical	45.00%	38.73%	43.33%	27.44%
Female Reverse Stereotypical	60.00%	26.87%	49.97%	26.01%
Male Reverse Stereotypical	57.50%	33.44%	41.73%	31.61%

Table 7: t and p values for Each Condition and Gender

	Male	Female
Stereotypical	$t(9) = -.205$, $p = .842$	$t(9) = -1.129$, $p = .288$
Reverse Stereotypical	$t(9) = -2.459$, $p = .036$	$t(9) = -1.621$, $p = .139$

Discussion

This study was designed to determine the effect of gender-stereotyped information – in particular, favorite color information – on children's memory and judgment. Participants between the ages of three and six were asked to distribute 12 colored pom poms to four stimulus children and to verbally recall their favorite colors. It

was hypothesized that: (a) children remember stereotyped – both stereotypical and counter-stereotypical – colors more often than neutral colors, (b) children remember stereotypical colors more often than counter-stereotypical colors, and (c) children ignore favorite color information in favor of stereotype-congruent information when distributing toys. These hypotheses stem from the idea that children use gender schemas to represent what is and is not appropriate for their gender according to their culture. Information contrary to these schemas is either forgotten, reinterpreted or ignored (according to traditional schema theory), or is particularly salient due to its peculiarity, leading to better recall (according to the Schema Pointer Plus Tag model).

Overall, results supported the hypothesis that children use schemata when remembering the favorite colors of their peers: children remembered stereotyped colors more accurately than neutral colors. According to schema theory, information that is gender-stereotyped is labeled "for me" or "not for me" and thus is more self-relevant than information that has no gender-association (Martin & Halverson, 1981). Thus, because stereotyped information is more self-relevant, it is more memorable than gender-neutral information. Interestingly, this finding was only significant for the reverse stereotypical group. In other words, children told about favorite colors that go against gender stereotypes were more likely to remember them than gender-neutral favorite colors, but children were not more likely to remember gender-typical favorite colors than neutral colors. This result provides initial support for the Schema Pointer Plus Tag (SP+T) model, in which information that goes counter to stereotypes is more salient and thus more memorable (Stangor & McMillan, 1992).

Given that children use schemas to remember information about favorite colors, it is logical to determine next whether information that conforms to or goes counter to those stereotypes is more memorable; in other words, to determine whether the Schema or SP+T model provides a more accurate explanation for the memory of gender stereotypes. To this end, the recall and distribution accuracy percentages were used to determine whether there is a difference in children's memory for stereotypical versus reverse-stereotypical favorite colors. Analysis showed that there was no significant effect of either stereotype condition or participant gender on children's recall or distribution of the favorite colors. This result runs contrary to both the Schema and SP+T models, which predict that stereotypical or counter-stereotypical information, respectively, is more memorable. It is unlikely that this result implies that stereotypes have no effect on memory, however, as the previous result has already shown that children rely on schemas for memory. Rather, it is more likely that color stereotypes are not as prevalent among or important to young children as one would expect them to be.

Although analyses revealed no significant effects on memory, there were some differences between participants' recall for favorite colors of male versus female stimulus children, suggesting that stereotypes may have differing importance depending on the gender of the recipient. In particular, for girls, having a favorite color that goes against gender stereotypes is no different than having a traditionally stereotypical favorite color: children remembered the stimulus girl's favorite color equally as often whether she liked pink or blue. However, slightly more children correctly remembered that the stimulus boy liked pink than correctly remembered he liked blue, although this result only approached significance. This finding is consistent with research done by Martin and Halverson

(1983), in which children remembered pictures of males participating in gender-inconsistent activities more often than gender-consistent activities, while the opposite was true of participants' memory for pictures of females. The moderate disparity between recall for male and female children's favorite colors suggests that, although it has become acceptable for young girls to like non-traditional colors, it continues to be a novel ideal for young boys and so is particularly salient to (and likely to be remembered by) all children. Additionally, the fact that counter-stereotypical information was slightly more memorable than stereotypical information provides more support for the SP+T model.

Several studies have found that children have significantly better memory for information consistent (as opposed to inconsistent) with societal stereotypes of gender, (Fyock & Stangor, 1994) as well as people in stereotype-consistent situations (Fyock & Stangor 1994; Ruble & Stangor 1986; Stangor & McMillan 1992). Thus, in this study, it should have been the case that children recalled that the stimulus girl liked pink and the stimulus boy liked blue regardless of condition. Analysis of the results revealed that this relationship may be more complex. At least with respect to gender stereotypes about color, children have a better memory for inconsistent information about males, while for information about females, children remember consistent information at least as well as inconsistent information. This finding is more in line with the SP+T model than those of previously conducted studies, whose results can be explained entirely by traditional schema theory. These results also imply that male recipients continue to be more constrained than female recipients – females violation of gender stereotypes about color are much more acceptable than male violations. Thus, the hypothesis that children remember stereotypical colors more accurately than reverse-stereotypical colors is neither

supported nor rejected by this experiment because the effect is different for male and female recipients.

The trend that children's responses to male recipients differed from their responses to females continues with their distribution of the twelve pom poms. For three out of the four female colors, the condition the participant was in (stereotypical versus reverse stereotypical) had a significant effect on whether that participant gave the pom pom to a girl or boy. In other words, children were more likely to give pink and purple pom poms to girls if one of the girls liked pink, and to boys if one of the boys liked pink. This result is of particular interest because (a) children were willing to give pink to a girl or boy, and (b) children generalized and extrapolated to other feminine colors: they were more likely to give a purple pom pom to a boy if one of the boys liked pink, even though the color purple was never explicitly mentioned as the favorite color of any child. The former finding shows that children are not unwilling to give pink toys to a boy, despite pink not being a 'boy color.' The latter is consistent with the results of a study by Eisenberg, Murray, and Hite (1982), which found that three and four year olds use gender stereotypes to make decisions about other children's likes and dislikes, providing support for the hypothesis that children judge other children based on their favorite colors (e.g. if a boy likes pink he is likely to prefer other female-stereotyped colors).

Contrariwise, distribution of the male colors did not depend on whether the participant was in the stereotypical or reverse stereotypical group. For the most part, participants gave the blue and green pom poms to boys regardless of whether they were told that the boy liked pink or blue. There are two possible explanations for this result: children gave the male-stereotyped colors to males either (a) because participants

believed that males could only get male-stereotyped colors, or (b) because participants believed that male-stereotyped colors could not be given to females. The fact that female-stereotyped colors were, in fact, given to males by participants in the reverse-stereotypical condition seems to support the latter explanation: children gave male colors to males because they were avoiding giving them to females. This result would seem to suggest that, contrary to the previous findings for recall, gender stereotypes are more important for female recipients. A more probable and consistent explanation is that participants were more likely to give boys pink than girls blue because they were more likely to remember that boys like pink. In other words, violation of male stereotypes was so novel as to be salient (and thus boys were given pink), whereas violation of female stereotypes was not as novel and so it was forgotten (and thus girls did not receive blue).

Finally, to determine whether, overall, children with atypical color preferences are treated differently than children with gender-stereotypical favorite colors, the recall and distribution percentages were compared for each child. Overall, children accurately recalled a larger percentage of colors than they distributed. Further analysis revealed that this effect was only significant for participants in the reverse stereotypical group, supporting the hypothesis that children remember favorite colors but may often choose to ignore them if they go against gender stereotypes. Consequently, only participants who were told that children liked colors that went counter to gender stereotypes recalled a higher percentage of favorite colors than they correctly distributed. These results provide support for the idea that children may give other children stereotyped colors, despite remembering that they had counter-stereotypical preferences.

Limitations and Future Studies

It is possible that the effect of color stereotypes, particularly for female recipients, has been underestimated in the current study due to the school from which the majority of participants were taken. At the Children's School, equality of all children is a core value. As such, gender stereotypes are discouraged in students there. These students have grown up around the idea of acceptance and thus would be less likely to judge their peers based on traditional gender stereotypes. Indeed, the line between stereotypical and counter-stereotypical color preferences may be more blurry for them, growing up in an environment where it is emphasized that it is acceptable for anyone to like any color. An attempted remedy was to test children from another school that has less of an emphasis on eliminating gender stereotypes; however, the majority of the children participating in this study came from the Children's School. It is possible that, as the United States is getting more progressive, the Children's School is, in fact, an accurate representation of the average preschool; however it is unlikely that children from a research school in a college town are representative of typical children in this case. Another study could replicate this experiment in a more standard, public school setting to determine whether a more stereotyped setting will produce different effects.

During the course of testing, the experimenter noticed an unexpected phenomenon: despite being told the names and shown pictures of the stimulus children, all of which were unambiguously male or female, some participants changed the gender of the stimulus child to coincide with the proper stereotype (e.g., when told the boy liked pink, they referred to him as "she"). Martin and Halverson (1983) found a similar result: children changed the sex of the actors participating in stereotype-inconsistent activities.

Additionally, Picariello, Greenberg, and Pillemer (1990) found that, when presented with stuffed animals of an unknown sex, preschoolers use color to identify whether the animal is male or female. It is possible that children in this study recalled counter-stereotypical information as accurately as stereotypical information because, instead of changing the favorite color to be stereotype-consistent, they changed the gender of the stimulus child. To lessen this ambiguity, a follow-up experiment might use even more unmistakable stimuli, such as male and female dolls, in place of photographs.

Another unexpected difficulty that occurred during the course of experimentation was the inexplicable tendency for children to distribute the white pom pom to males, regardless of condition, despite pre-testing of the colors that indicated white was regarded as gender-neutral. Because the gender of stimulus child whose favorite color was white was counter-balanced across conditions, the white pom pom should have been distributed equally to male and female stimulus children (as was the case for the red pom pom). Instead, children in both conditions overwhelmingly gave the white pom pom to males. This result is particularly perplexing because, in the pre-survey of color stereotypes, though 82% of participants surveyed viewed white as gender neutral, the remaining 18% rated it as slightly feminine. Not a single survey participant viewed white as even slightly masculine. Clearly, in this case, young children have different gender-associations than undergraduate students. This finding is also inconsistent with studies by Chun (2005) and Cherney, Harper, and Winter (2005), which also determined white to be rated as neutral by children. To eliminate this problem, a follow-up study could use yellow, which was evenly distributed amongst males and females, as a neutral favorite color in place of white.

Lastly, because schemata are more fully developed in older children (Stangor & McMillan, 1992), it can be expected that memory effects as well as peer judgment will differ with age. Obviously, if a child has no knowledge of a particular stereotype, that stereotype will have no effect on his or her perception. Chun (2005) did find a significant difference in the color-stereotype knowledge of 3-year-olds and 5-year-olds, with the older children's color stereotypes being more consistent with each other, and more consistent with adult color stereotypes. The present study combined participants of all ages into one group due to small sample size and power concerns. Future studies may separate 3-year-old and 5-year-old children because it is believed that their color schemata may have significantly developed between those two ages. By comparing the results of these two ages, the effect of color schemata on judgment and memory can be better assessed.

Summary and Conclusions

The results of this study supported the hypothesis that children use schemas to aid in memory of their peers' favorite colors. Further, results also supported the idea that violation of gender schemas vary in importance depending on the gender of the peer. Violation of male gender stereotypes was particularly novel and thus remembered by children, whereas violation of female stereotypes was less surprising and so less likely to be remembered. In other words, not all stereotype violations are equally salient, and so a violation must cross a certain threshold of salience in order to be remembered. Thus, it is possible that Schema Pointer Plus Tag theory represents children's memory only when violations of gender stereotypes are sufficiently abnormal, while Schema theory models memory the remainder of the time. Lastly, children were more likely to ignore favorite

color information, despite remembering it, when that information went against their preconceived stereotypes. Further research can explore children's tendency to change the gender of the recipient in counter-stereotypical situations, as well as possible age effects.

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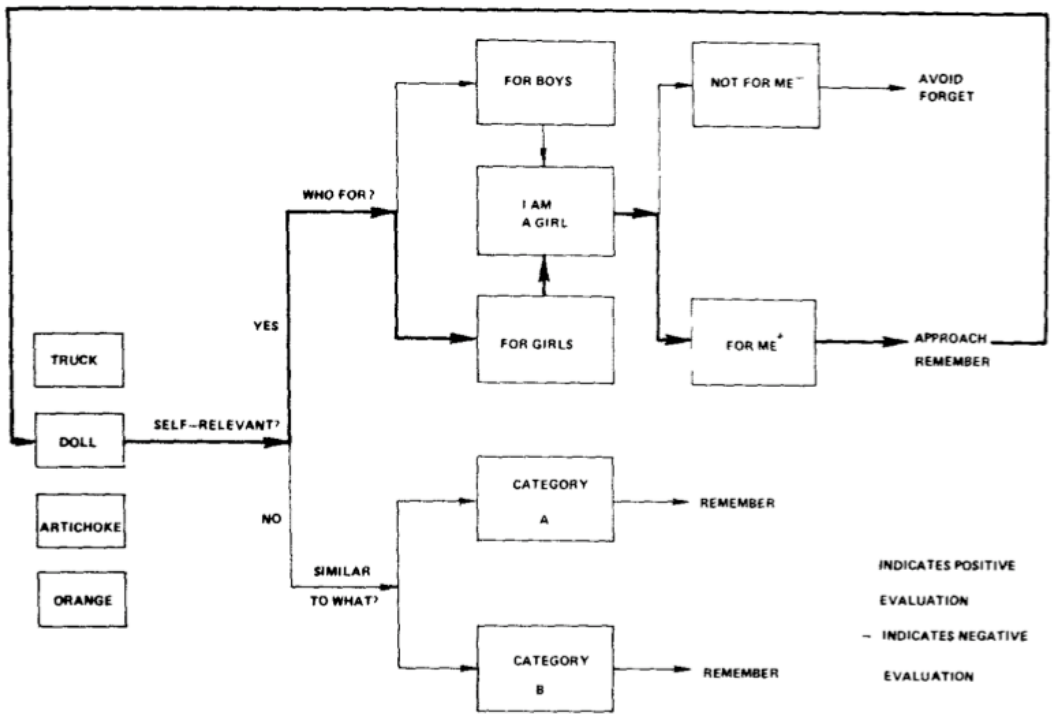
Appendix A

Figure 1 (Martin & Halverson, 1981)



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Appendix B

Table 1

Analyses of Variance for Recall and Distribution Accuracy

Source	*df*	*F*	*P*
	Recall Accuracy		
Participant Gender (G)	1	1.157	.290
Stereotype Condition (S)	1	.129	.722
Neutral Condition (N)	1	2.414	.130
G X N	1	.700	.409
G X S	1	.700	.409
N X S	1	.014	.906
G X N X S	1	1.729	.198
Error	32		
	Distribution Accuracy		
Participant Gender (G)	1	1.822	.187
Stereotype Condition (S)	1	.271	.606
Neutral Condition (N)	1	1.821	.187
G X N	1	7.879	.008
G X S	1	.103	.750
N X S	1	.531	.472
G X N X S	1	2.440	.128
Error	32		

Table 2
Recall and Distribution Accuracy Mean Percentages for Male and Female Participants Stereotype and Neutral Conditions

	Male Participants							
	Stereotypical Condition				Reverse-Stereotypical Condition			
	White		Red		White		Red	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Recall	35.00	41.83	55.00	37.08	60.00	45.42	55.00	20.92
Distribution	40.00	36.52	46.67	18.26	56.73	38.28	26.73	14.85
	Female Participants							
Recall	60.00	37.91	70.00	32.60	40.00	13.69	80.00	20.92
Distribution	43.41	30.21	70.00	18.26	30.00	7.45	69.93	21.68

Figure 4: Distribution of the Dark Pink Pom Pom

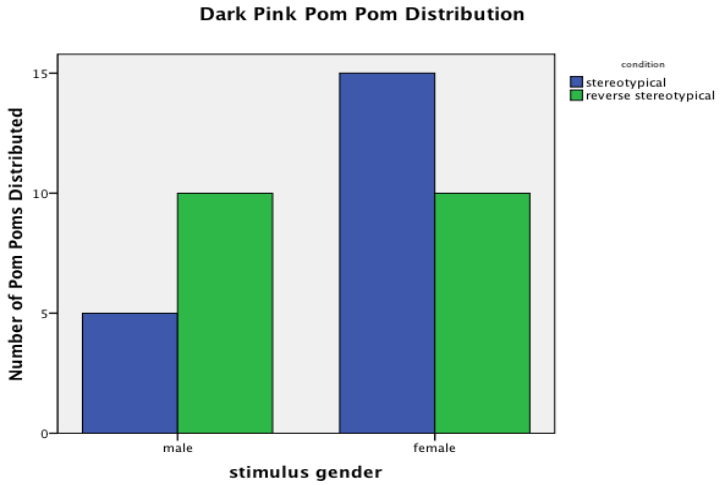

Figure 5: Distribution of the Light Pink Pom Pom

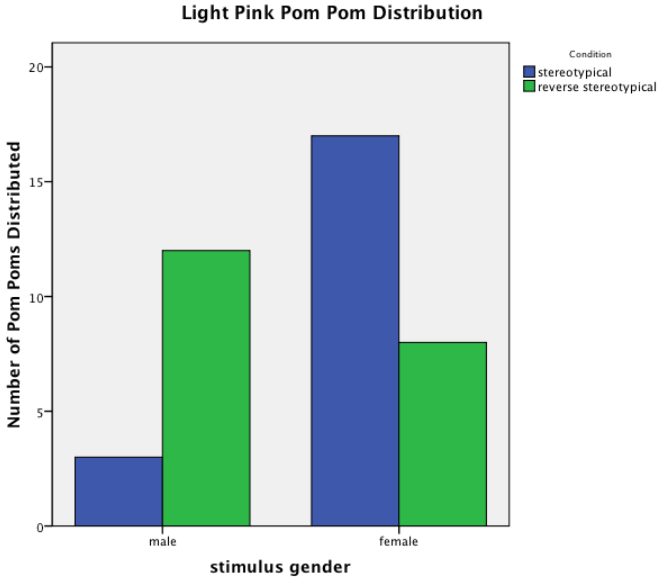

Figure 6: Distribution of the Dark Purple Pom Pom

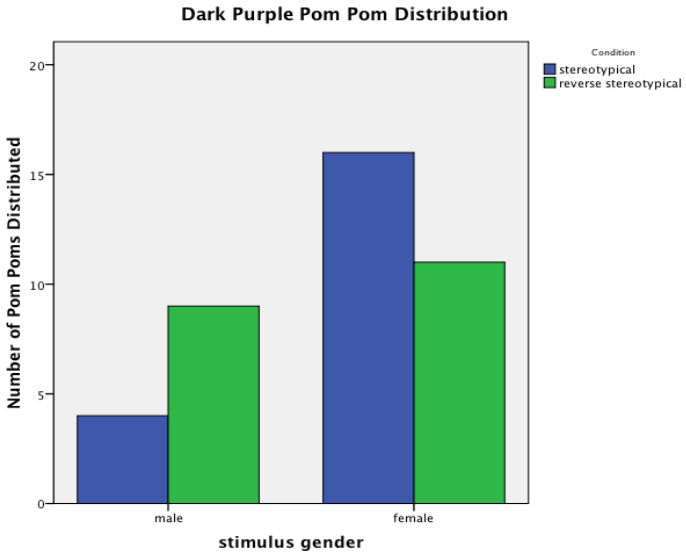

Figure 7: Distribution of the Light Purple Pom Pom

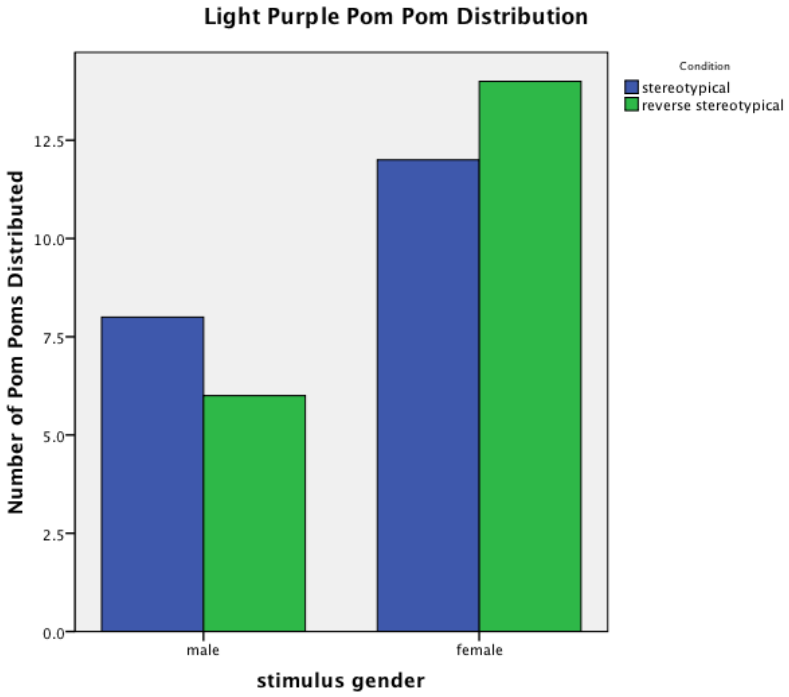

Figure 8: Distribution of the Dark Blue Pom Pom

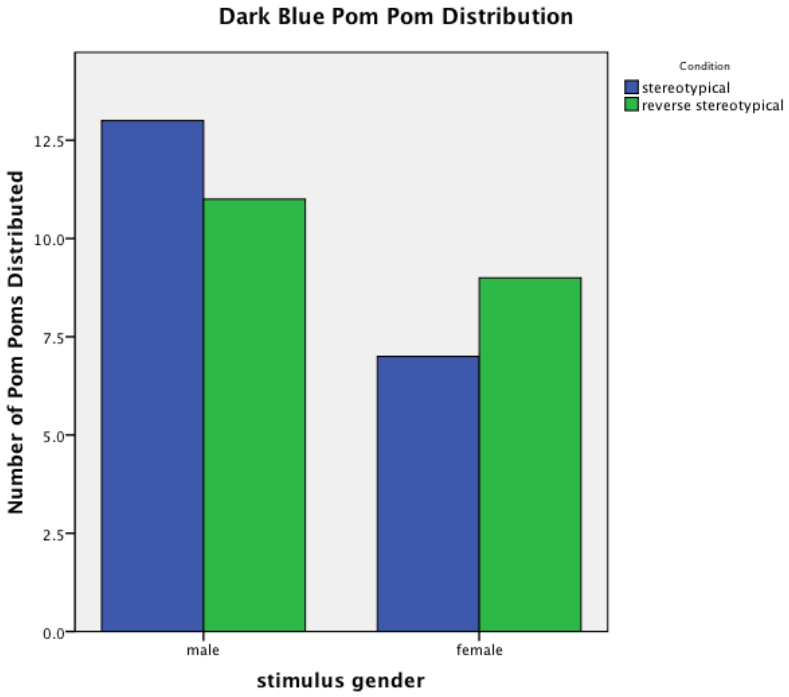

Figure 9: Distribution of the Neon Blue Pom Pom

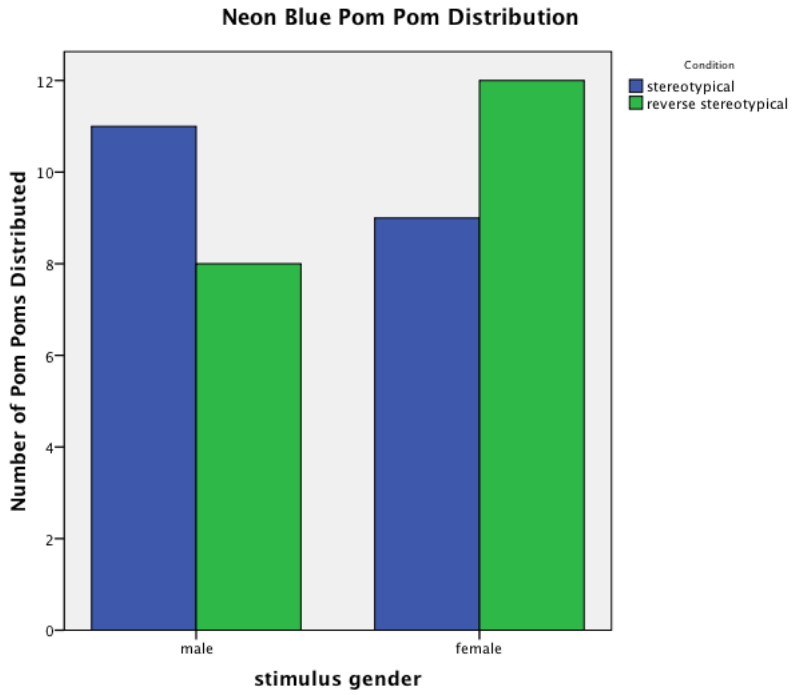

Figure 10: Distribution of the Dark Green Pom Pom

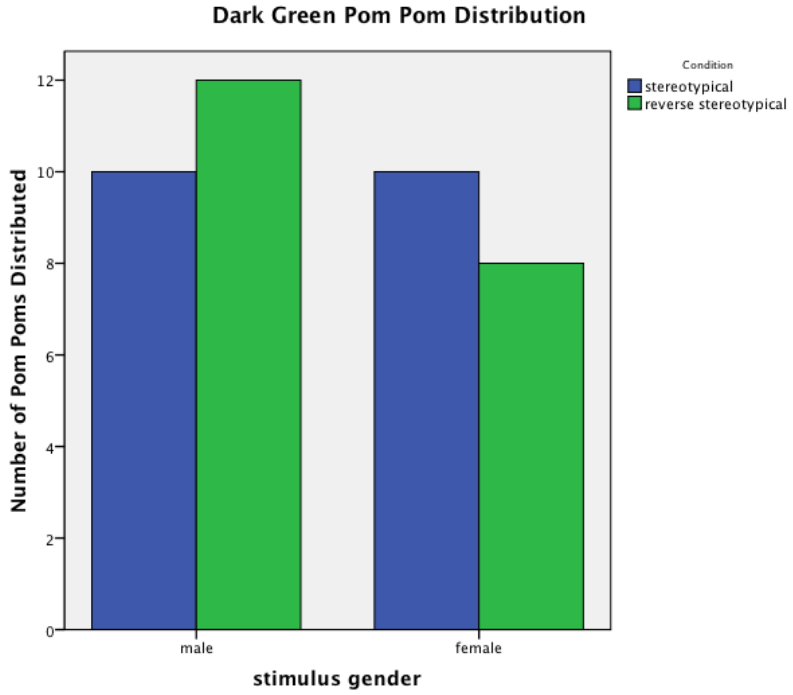

Figure 11: Distribution of the Neon Green Pom Pom

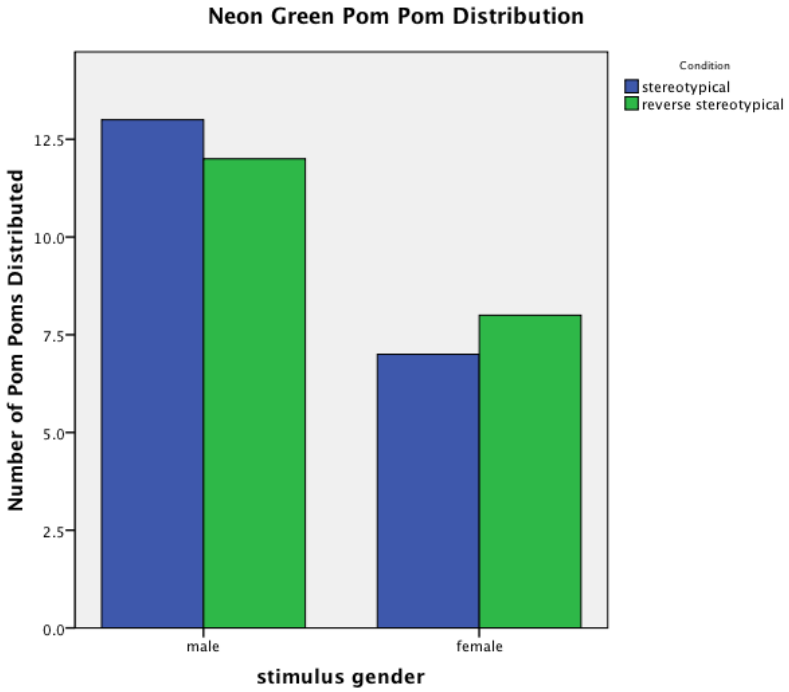

Figure 12: Distribution of the Red Pom Pom

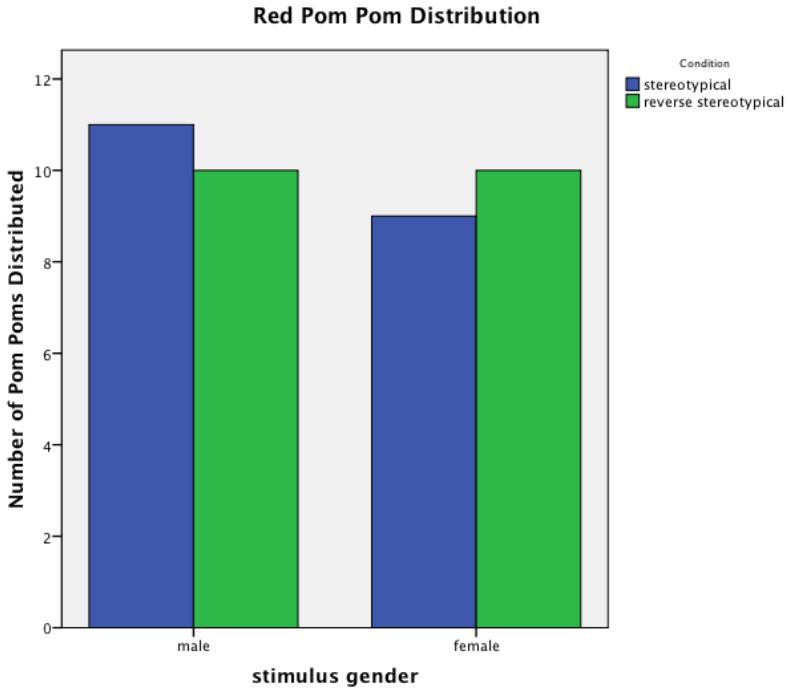

Figure 13: Distribution of the Orange Pom Pom

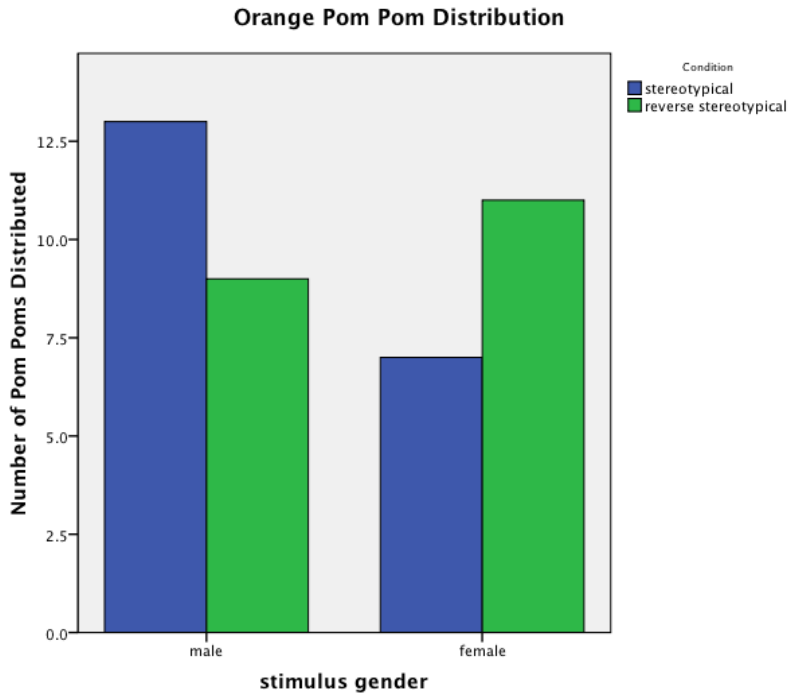

Figure 14: Distribution of the Yellow Pom Pom

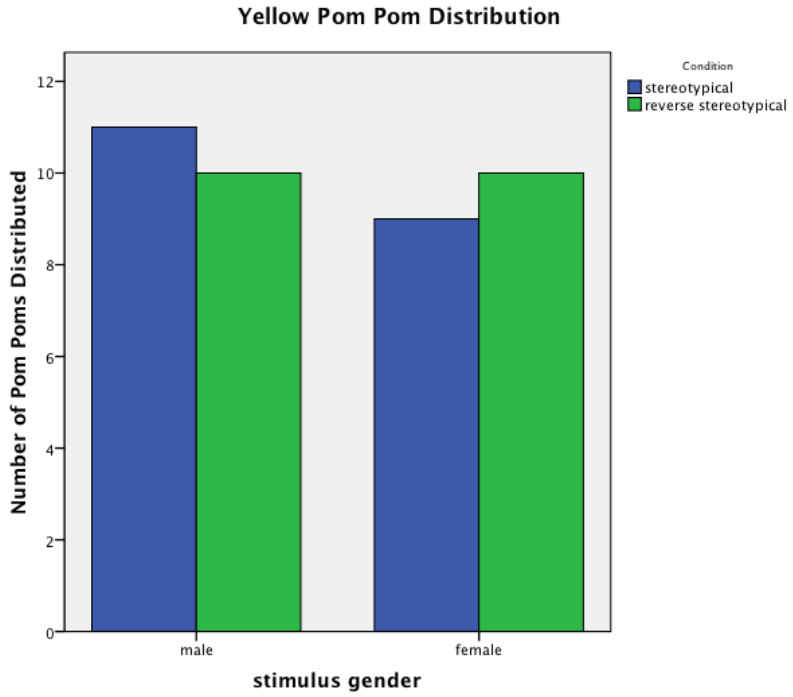

Figure 15: Distribution of the White Pom Pom