The Choice of Color, Topic and Toys: An Empirical Study of Gender Roles

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Abstract

Typically, toy manufacturers use the color pink for girls' toys and the color blue for boys. They also design gender-related theme worlds for girls and boys based on gender-based stereotypes, justified by different playing preferences of the two sexes. Socially-oriented toys such as dolls are meant for girls and non-social toys such as trucks are attributed to boys. In toy shops, early-stage shaping of the gender profile is thus achieved by color and theme design. This early-stage reinforcement and reproduction of gender stereotypes has been criticized because stereotyping can limit further child development and learning. The goal of this article is to examine the contribution of the color-setting and theme design to the perception of toys, the gender-related assignment as well as the preferences for playing with toys. For this purpose, the use of the eye-tracking technology is combined with a questionnaire. In an experiment six pairs of "LEGO®" models, which have been systematically varied in color and theme, are shown to 74 four- and five-year-old children. The results reveal that the original gender-stereotyped "LEGO®" models attract more attention among children than the varied gender-incongruent models. The original "LEGO®" models are clearly assigned to gender. In the case of the varied models, the color is more distinctive than the theme for gender classification and the interest in playing with the models.

Keywords: target group marketing, product gendering, toys choice, eye-tracking technology
JEL classification: M 14, M 31, M 37

Introduction

Imagine walking into any infant's room: you could almost guess the gender of the three to five years old child just by looking at his or her toys. While girls are surrounded by pink-colored social toys such as dolls, dollhouses and princess costumes, boys are surrounded by blue non-social toys such as cars, action figures and a racetrack. This gender-typed differentiation is not limited to toys. Advertisements show little girls in pink dresses or carrying a pink satchel with a horse on it. In contrast, boys are displayed with blue clothes and in active or adventurous situations (LoBue et al., 2011). Companies use gender as a segmentation criterion to identify market segments with similar needs, and to satisfy these needs through gender-specific

marketing. In addition to the allegedly better satisfaction among customers of gender-specific needs, gendering products can also be effective for fully exploiting the entire market potential (Cowart et al. 2014).

The goal of this contribution is to highlight the methods applied mainly in gendering toys, and to critically question the effects of this on children. For this purpose, the applications of the gender-specific design of toys are theoretically discussed, in order to experimentally examine the effects of color and thematic worlds on children with the example of the toy, "LEGO® DUPLO®".To identify the contribution of these design elements to children's perceptions of toys, the gender-related attribution and preferences of playing with a particular toy, eye-tracking technology will be combined with a questionnaire.

Theoretical Background

The term "gender" describes people in their social and cultural dimensions. "Doing gender" describes accordingly the state of the conscious and unconscious process of developing a sex beyond the biological constitution, with the associated attributes and the emphasizing of differences which are neither biologically given nor essential (West et al., 1991). According to Kohlberg (1966), children around the age of two to three become aware of their biological sex. The self-categorization as a girl or a boy occurs at this age because of a gender-specific external representation such as hairstyle or clothing. Due to the gender-specific toys provided by the parents and their imitation of the observed environment children behave gender-specifically in their selection of toys from a very early age (Baacke, 1999). This indicates that the gender-specific behavior is already develops from a young age and is not just congenital.

While Butler (1991), a follower of Constructivism, considers the biological gender as a cultural construct, others criticize the constructivist view that congenital gender and the resulting differences in gender research are not paid enough attention. However, it is not clear to what extent socialization effects or biological determinants influence the formation of individual gender identity. With regard to the choice of toys some studies demonstrate that children develop preferences for gender-specific toys only during the second year (Serbin et al., 2001). Irrespective of sex, 12-month-old children prefer dolls over cars (Jadva et al., 2010). On the other hand, Alexander et al. (2009) found in an eye-tracking study with children aged three to eight months that gender-specific preferences for dolls and cars are already distinctive at this age. According to the authors this refers to a biological predisposition which is present from birth.

Dammler (2011) pleads for a combination of these two point of views. It should be assumed that a gender assessment operates as a framework, but with "much room for individual development of the individual" (Dammler, 2011, p. 40).

Implications for Marketing

For this reason successful marketing must address gender-specific basic needs of children (Dammler, 2011). Otherwise products will remain on the shelves. Through the use of various product features the products receive a product-specific identity. This results in the conclusion that the toys are linked to a specific sex. In most cases the use of key signals such as language, color, symbols and testimonials are differentiated which result in more or less clear associations and stereotypical roll assignments. Studies demonstrate that product gendering by producers is still widespread despite the fact that western societies attempt to break through the image of classical gender roles (Fugate et al., 2010).

Various design elements are available for giving toys a male or female identity. These represent the social framework associated with the theme worlds of toys, color (Nelson 2005), advertising (Debevec et al., 1986; Eisend, 2010), shape and surface structure (van Tilburg et al., 2015).

Girl-specific products are characterized by the color pink, primarily in pastel shades. In the case of boy-specific products blue dominates and a more intensive coloring is observed (Auster et al., 2012). Adults and children are aware of this color assignment to gender (Weisgram et al., 2014; Wong et al. 2015). While boys tend to have toys that reflect public life, e.g. construction machinery or other work equipment needed for the non-residential workspace, girls are much more inclined to play with toys that represent the private sphere of life and imitate household objects (Nelson 2005).

Methodology

The goals of this paper are: to examine the contribution of the color-setting and the theme to the perception of toys, the gender-related attribution as well as the preference to play with a toy. The following questions are of particular interest:

a) does the color/the theme of toys influence the gaze plot of children,
b) do sex-congruently designed toys receive more attention,
c) do children classify sex-congruently designed toys more clearly as toys for "girls only" or "boys only" than sex-incongruently designed toys, and
d) do children prefer toys the more sexually congenial they were designed and the more they are attributed to their own sex?

In general, up to 90% of the perceived information is visually conveyed (Schub von Bossiazky, 1992). Yet, eye-tracking provides the opportunity to capture perceptual processes with technical equipment. Eye-tracking employs infrared cameras measuring where, how long and in what sequence individuals focus on specific objects. Nowadays eye-tracking is used in a wide range of areas, for instance in neuroscience, marketing, computer science and industrial engineering (Duchowski, 2002). A small number of empirical surveys demonstrate that the application of these instruments is promising for the analysis of visual perceptions in the field of gender marketing for toys (Escudero et al., 2013).

In order to make sensible use of eye-tracking technology the method was combined with a questionnaire and visual monitoring to capture comments and emotions. The stationary eye-tracking system "Tobii X60 – 60 Hz", enabling the actimetry and analysis of individual gaze behavior was employed for the documentation of the study.

"LEGO® DUPLO®" was chosen as a demonstration object, as these toys have both boys and girls as target groups. There are also many theme worlds available in different colors. The colors blue and pink were selected as boy-typical and girl-typical colors, respectively. A castle was used as a typical product for boys, since it may be connected with adventure and action. A house was used as a typical product for girls as it is associated with social aspects such as caring and interpersonal interaction at home. The systematic variation of the two colors and products resulted in four "LEGO® DUPLO®" models differing in their sex-congruence. These four models were shown in six different pairs (e.g. pink house and blue knight castle) to identify the visual preference for a toy. The visual preference was defined by a longer fixation time on an illustrated toy.

The display of the models was based on a systematic variation and displayed in pairs to the children- each for six seconds. A child-friendly interview followed with the help of a trained nursery teacher. The children were asked to classify the two original

and the two manipulated toys on the pictures as male or female toys. Three cards showing "a boy", "a girl" or "a boy and a girl" were given to them. They could respond by pointing to one of these cards. In order to determine their preference for each of the four "LEGO® DUPLO®" models, the children were asked: "Would you like to play with the "LEGO® DUPLO®" model?" In addition a Likert scale was applied by using smileys from very happy to very sad.

In a pre-test with four - and five-year-old children, the experimental set-up and the interview concept were tested for intelligibility and child-friendly design. The type of questions and tasks, proved comprehensible and traceable for the children. The participants of this empirical study were 74 four- and five-year-old children, who were familiar with "Lego®" and, at a minimum, did not completely refuse it as a toy to play with. The order of the images shown to the children was randomized both during the eye-tracking procedure and in the survey.

Results

The combined method described above was successfully applied with children as participants. With the exception of three children the gaze behavior was entirely captured. The "LEGO® DUPLO®" models were defined as areas of interest (AOI). Visual preferences were measured with the help of visual fixation durations of these AOI. In order to demonstrate distinctly the effect of experimentally varied toys on visual preferences of girls and boys, sex-congruently designed pairs of models were opposed to sex-incongruently designed models in a first step. In a second step, the influence of color on the visual preferences were examined by defining the relevant theme and varying the color at the same time. In a third step, colors were defined and the theme was varied in order to examine the theme.

Table 1 displays the visual preferences of boys for the blue castle while sex-congruently designed models are compared. At the same time, they pay little attention to the pink house. However, no significant difference can be detected for the visual preferences of girls in the case of sex-congruently designed models. In the case of sex-incongruently designed models both girls and boys pay more attention to the pink castle than to the blue house, whereby the difference is more obvious for boys than for girls. This leads us to the conclusion that the visual attention of boys is more focused on gender-stereotypical themes than that of girls.

Table 1

Total time of Interest fixation duration in seconds: sex congruence

	Sex-Congruent				Not Sex-Congruent			
	Pink House		Blue Castle		Blue House		Pink Castle	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Girls	2.37	1.33	2.33	1.34	1.76	1.20	2.49	1.38
Boys	1.37	1.05	2.59	1.23	1.68	1.23	2.46	1.40

Source: Authors' calculation

In the case of a defined theme and varying colors (table 2) a distinct and significant visual preference of girls for the pink castle as opposed to the blue castle is revealed. However, girls also visually prefer the blue house to the pink house. The visual preferences of boys are similar for all models, except for the pink castle which receives slightly more visual attention than the blue castle. In total, sex-incongruently designed "LEGO®" models receive more attention than sex-congruently models.

Table 2
Interest fixation duration in seconds: fixed theme - changing colors

	House				Castle			
	Blue House		Pink House		Blue Castle		Pink Castle	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Girls	2.40	1.29	1.97	1.18	1.65	0.88	2.49	1.15
Boys	2.08	0.93	2.03	1.09	1.97	1.02	2.23	1.20

Source: Authors' calculation

Giving identical colors and varying themes (table 3), girls look at the blue house longer than at the blue castle, while boys have exactly the opposite preference. In the case of blue models attention is apportioned according to gender-typical themes. In the case of pink models boys have a higher visual preference for the theme "castle", whereas the house receives little attention. The gaze behavior is gender-stereotypical for boys. In contrast, girls look longer at pink castles than at pink houses. With one exception, both girls and boys look at sex-incongruently models longer than sex-congruently models.

Table 3
Total time of Interest fixation duration in seconds: fixed color – changing theme

	Blue				Pink			
	Blue House		Blue Castle		Pink Castle		Pink House	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Girls	2.64	1.10	2.22	1.01	2.64	1.35	1.73	0.99
Boys	1.81	1.08	2.24	1.35	2.71	1.46	1.31	1.06

Source: Authors' calculation

In order to verify whether or not the attention given to a "LEGO® DUPLO®" model is related to a particular preference, children were asked whether they want to play with that model. In addition, they were asked to classify the models as male or female toys. The results are summarized in table 4.

Table 4
Gender classification of "LEGO® DUPLO®" models and preference to play

	Gender Classification*				Preference to Play**			
	Girls		Boys		Girls		Boys	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pink House	1.06	0.34	1.00	0.00	1.33	1.02	2.84	1.76
Pink Castle	1.29	0.71	1.56	0.91	1.77	1.41	2.57	1.88
Blue House	1.55	0.91	1.86	1.00	1.91	1.47	2.18	1.66
Blue Castle	2.66	0.77	2.89	0.47	3.29	1.82	1.29	0.84

Source: Authors' calculation
**Note*: Scale where 1 = only girls, 2 = girls and boys, 3 = only boys
***Note*: Likert scale where 1 = very much like to play with, 5 = not at all happy to play with

Children identify sex-congruently designed "LEGO® DUPLO®" models as such. Girls and boys identify the pink house and the blue castle as toys for girls and boys respectively. Moreover, the allocation of these attributes is more definite for boys than for girls. As expected, sex-incongruently designed models are assigned to a particular sex less unanimously. This reflects the tendency that both girls and boys can play with these models equally well with a slight stronger tendency among girls.

In comparison to sex-congruently designed toys, the standard deviation of the sex-incongruently designed models is higher. In addition, a higher level of uncertainty and a lower level of unambiguity is revealed for gender classification. Furthermore, low average values for the pink castle indicate that it is prevailingly assigned to the female gender despite the male theme. This holds true especially for the visual preferences of girls. As a consequence, the color "pink" affects gender assignment more than the theme "castle".

Preferences for playing with one of the toys are similar to gender assignments. Clearly, sex-specifically designed toys that are identified as such by the children are also preferred by them. In other words: girls prefer to play with the pink house and boys with the blue castle. Accordingly, children show little enthusiasm for toys not designed for their own sex. Thus, high standard deviations indicate a higher level of inhomogeneity among preferences. Some children clearly reject those models whereas others do not mind any specifically assigned gender identity in the toy.

Both girls and boys prefer sex-incongruently designed models less than those toys they consider to be more appropriate for their own gender. However, boys are more observant than girls. Similar to the gender assignment, boys find the pink castle less appropriate for their own than girls. In addition, they tend to decline playing with that model. Furthermore, boys are less observant with the blue house, and they tend to not classify this model as a toy for girls. Girls slightly prefer the pink castle in comparison to the blue house. This preference is in accordance with the gender assignment of the models. The more a toy can be assigned to the own biological sex, the stronger the preference among children in this study. This may be seen as a fundamental insight of this endeavor.

Discussion

The empirical study demonstrated that both the thematic and the color design of toys have a significant impact on the perception and behavior of children. The distinct gender-stereotypical toy design increases the visual preferences of children. This results in an unequivocal gender assignment, and evokes a strong playing preference. Both the eye-tracking exercise and the questionnaire support the stereotype of boys preferring to play with blue castles and girls preferring pink houses. Conversely, this means that boys and girls only reluctantly play with pink houses and blue castles, respectively. This means gender-stereotypical toys polarize. Hence, sex-incongruently designed toys do not polarize. Furthermore, the latter are less monitored, the gender assignment is rather vague, and the preferences are weaker. From an economic point of view producers of toys act rationally when they design their products in a gender-stereotypical way. The priority here is on the color as opposed to the theme.

For the product design, the sex-incongruently combination of colors and themes can result in high visual attention. As an example, the pink castle is observed longer than any other toy independent of sex. However, these sex-incongruently combinations of color and theme result in less distinct gender-specific product identity. Moreover, the playing preferences only reach a moderate level. Thus, visual attention cannot be equated with a playing preference for toys. Visual attention seems rather to be evoked by breaking through a (formerly familiar) behavioral pattern. If the objective is to encourage girls and boys to jointly play with the same toy or girls and boys respectively approaching each other themes, then sex-incongruently designed toys may be helpful in offering a bridge between the two gender-specific preferences. Although, no outstanding enthusiasm may be

expected from both genders for the sex-incongruently designed toys, a moderate preference for playing with them can be expected.

Conclusion

The evaluation of the combined eye-tracking/questionnaire study revealed a general applicability of this methodology for the analysis of product design elements in children's toys. Empirical studies to detect: 1) the influence of colors and themes on visual preferences; 2) the assignment of gender identities to products; and 3) the playing preferences for these products, can be conducted with preschoolers. A solitary eye-tracking study without a questionnaire may result in misinterpretations, if the visual attention is equated with the interest in a specific toy.

Limitations may be expected due to the small number of product design features of toys. In this specific case study only the colors pink and blue and the themes house and castle are employed. For this reason, a follow-up study should involve more colors and themes but also additional design elements such as shape, surface and structure. The same holds for the application of advertisement elements. For example, female and/or male subjects might play with several "LEGO® DUPLO®" models, and in this way provide a projection surface in order to facilitate identification of or overcome gender-stereotypical perceptions among children.

References

1. Alexander, G. M., Wilcox, T., Woods, R. (2009), "Sex differences in infants` visual interest in toys", Archives of sexual behavior, Vol. 38 No. 3, pp. 427-433.
2. Auster, C. J., Mansbach, C. S. (2012), "The Gender Marketing of Toys - An Analysis of Color and Type of Toy on the Disney Store Website" Sex Roles, Vol. 67, pp. 375-388.
3. Baacke, D. (1999), Die 0-5 Jährigen – Einführung in die Probleme der frühen Kindheit, Beltz.
4. Butler, J. (1991), Das Unbehagen der Geschlechter, Suhrkamp.
5. Cowart, J. O., Darke, P. (2014), "Targeting Miss Daisy: Using age and gender to target unethical sales tactics", Marketing Letters, Vol. 25, pp. 67-75.
6. Dammler, A. (2011), Rosa Ritter & schwarze Prinzessinnen Was wirklich "typisch männlich" und "typisch weiblich" ist, Gütersloher Verlagshaus.
7. Debevec, K., Iyer, E. (1986), "Sex roles and consumer perceptions of promotions, products, and self: What we know and where should we be headed?", Advances in Consumer Research, Vol. 13, pp. 210-214.
8. Duchowski, A. T. (2002), „A breath-first survey of eye-tracking applications", Behavior Research Methods, Instruments & Computers, Vol. 34 No. 4, pp. 455-470.
9. Eisend, M. (2010), "A meta-analysis of gender roles in advertising", Journal of the Academy of Marketing Science, Vol. 38 No. 4, pp. 418-440.
10. Escudero, P., Robbins, R. A., Johnson, S. P. (2013), "Sex-related preferences for real and doll faces versus real and toy objects in young infants and adults", Journal of Experimental Child Psychology, Vol. 116, pp. 367-379.
11. Fugate, D. L., Phillips, J. (2010), "Product gender perceptions and antecedents of product gender congruence", Journal of Consumer Marketing, Vol. 27 No. 3, pp. 251-261.
12. Jadva, V., Hines, M., Golombok, S. (2010), "Infants` preference for toys, colors, and shapes: sex differences and similarities", Archives of Sexual Behavior, Vol. 39 No. 6, pp. 1261-1273.
13. Kohlberg, L. (1966), "A cognitive developmental analysis of children's sex-role concepts and attitudes", in Maccoby, E. (Ed.), The development of sex differences, Stanford, Stanford University Press.

14. LoBue, V., DeLoache, J. S. (2011), "Pretty in pink: The early development of gender-stereotyped colour preferences", British Journal of Developmental Psychology, Vol. 29, pp. 656-667.
15. Nelson, A. (2005), "Children`s Toy Collections in Sweden? A Less Gender-Typed Country?", Sex Roles, Vol. 52 No. 1-2, pp. 93-102.
16. Schub von Bossiazky, G. (1992), Psychologische Marketingforschung, Vahlen, München.
17. Serbin, L. A., Poulin-Dubois, D., Colburne, K. A., Sen, M. G., Eichstedt, J. A. (2001), "Gender stereotyping in infancy - Visual preferences for and knowledge of gender-stereotyped toys in the second year", International Journal of Behavioral Development, Vol. 25 No. 1, pp. 7-15.
18. van Tilburg, M., Lieven, T., Herrmann, A., Townsend, C. (2015), "Beyond "Pink It and Shrink It": Perceived Product Gender, Aesthetics, and Product Evaluation", Psychology & Marketing, Vol. 32 No. 4, pp. 422–437.
19. Weisgram, E. S., Fulcher, M., Dinella, L. M. (2014) "Pink gives girls permission: Exploring the roles of explicit gender labels and gender-typed colors in preschool children`s toy preferences", Journal of applied Development Psychology, Vol. 35 No. 5, pp. 401-409.
20. West, C., Zimmerman, D. H. (1991), "Doing Gender", in: Lorber, J., Farell, S. A. (Ed.): The Social Construction of Gender, Sage, pp. 13-37.
21. Wong, W. I., Hines, M. (2015), "Effects of gender color-coding on toddlers` gender-typical toy play", Archives of sexual behavior, Vol. 44 No. 5, pp. 1233-1242.

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