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To cite this article: Dan Zhang (2018): Color Versus Form: Which Matters More in Children's Preferences of Package Design?, Journal of International Consumer Marketing, DOI: [10.1080/08961530.2018.1436482](https://doi.org/10.1080/08961530.2018.1436482)

To link to this article: <https://doi.org/10.1080/08961530.2018.1436482>



Published online: 16 Apr 2018.



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Color Versus Form: Which Matters More in Children's Preferences of Package Design?

Dan Zhang

Department of Marketing, School of Business, City University of New York – College of Staten Island, Staten Island, New York, USA

ABSTRACT

This research investigates the effects of age and gender on children's color-form preference of package design. With two datasets from China and the U.S., we also explore cultural differences. Two separate 2 (color) x 2 (form) experimental surveys were conducted among 837 and 761 children of age 3–12 from China and the U.S., respectively. The results reveal that Chinese and U.S. children share the same tendency of switching from color to form with the increase in age. Nevertheless, gender effect and age-gender interaction are found in the Chinese sample only. More Chinese boys than girls show preference by color. The difference in the color-form package preference between Chinese younger girls and older girls is significantly greater than that of boys.

KEYWORDS



Children; color; form; package design; preference

Introduction

Human interest in color and form perception can be traced as far back as Aristotle, although empirical psychological research did not start until the beginning of the twentieth century (Kuhlman 1904). While clinical psychologists emphasize color and form as a personality indicator and diagnostic tool, developmental researchers have focused on maturational changes in response to color and form, investigating effects of color and form on children's perception, cognition, etc. (Bremner *et al.* 2013; Katz 1975; Wilcox and Chapa 2004). Applied in the field of marketing, researchers have studied color and form from perspectives of advertising effectiveness, brand personality perceptions, food marketing, and consumer spending preferences (e.g., De Bock, Pandelaere, and Van Kenhove 2013; Labrecque and Milne 2012; Lohse and Rosen 2001; Romero and Craig 2017). Specifically related to the present study, researchers have found that color and form of packaging affect perceived package weight and volume (e.g., Gunlach and Macoubrey 1931; Payne 1958; Raghubir and Krishna 1999), increase purchase intention (e.g., Garber, Burke, and Jones 2000; Labrecque and Milne 2012), and influence brand choice and product quality perception (e.g.,

Kauppinen-Räsänen 2014; Labrecque, Patrick, and Milne 2013; Scott and Vargas 2007).

Color and form of packaging are especially essential when targeting children, because children prioritize visual processing of information in order to compensate for their cognitive deficiencies, and consequently, they prefer visual rather than verbal operations (Brée 2012; Peracchio 1992). Although not much research has examined the effect of packaging on children's consumer behavior (e.g., Gollety and Guichard 2011; McNeal and Ji 2003; Nelson, Duff, and Ahn 2015; Ogba and Johnson 2010; Pires and Agante 2011; Ülger 2009) and work on color/form and packaging with children is especially scant, the very limited number of extant research studies do suggest that both color and form have a strong influence on children's brand perception and preference of packaging and products (Bezaz 2014; Marshall, Stuart, and Bell 2006; Zhang 2014, 2018a, 2018b). For example, chromatic color of packaging is found to have a positive impact on children's brand recognition; and younger children are more likely to be affected by package color when selecting products (Bezaz 2014; Marshall, Stuart, and Bell 2006). Package form is also found to significantly influence children's preference of package design

CONTACT Dan Zhang, Ph.D.  dan.zhang@csi.cuny.edu  Department of Marketing, School of Business, City University of New York – College of Staten Island, 2800 Victory Blvd., Staten Island, NY 10314, USA.

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(Zhang 2014, 2018a, 2018b). Nevertheless, little research has been conducted to explore how children's preferences are shaped when color and form, two common attributes of packaging, are simultaneously presented.

The developmental psychology literature suggests that color and form significantly affect children's preference, and that there is a relationship between age and gender, and the effect of these variables (e.g., Corah 1966; Katz 1975; Sera and Milette 2011; Suchman 1966). For example, children below age 6 are found to predominantly respond to color, in contrast to those above age 6 whose responses are primarily dominated by form (Corah 1964, 1966; Suchman and Trabasso 1966). Also, scattered studies find that gender difference may exist, suggesting that boys tend to respond to color rather than form as compared with girls (Honkavaara 1958; Katz 1975). However, these relationships have been unexplored in the consumer behavior literature, and in the broader marketing literature in general.

The present study aims to address this research gap and investigates children's color-form preferences of package design. Specifically, we develop hypotheses on age and gender differences in children's package preference by color versus form based on the literature on color and form perception and preference. The research adds to the literature stream on packaging and children's consumer behavior by clarifying the complex relationships that exist between age, gender, and color-form preference, and also provides insights to practitioners responsible for children's packaging.

We also explore cultural differences by testing our research hypotheses with two datasets collected from China and the U.S. We chose these two cultures for three reasons. First, China and the U.S. represent two distinctive cultures: the Oriental and the Western cultures, which are significantly different from each other (Cousins 1989; Yang *et al.* 2013). Second, China and the U.S. are both big in children's spending. With the ending of the one-child policy, Chinese children's market is seen as one of the fastest and most lucrative markets (Xinhua 2017). Meanwhile, with annual child-rearing expense estimates ranging between \$12,350 and \$13,900 for a child in an average 2-child middle-income family, U.S. children's market remains top of the world (Lino *et al.* 2017). Third, China and the U.S. are also major partners and competitors in the market for children's products. For a long period,

China was the largest manufacturer and exporter of toy products of the world markets including the U.S., manufacturing over 70% of the world's output. Meantime, with China's large market size and steady economic performance, many U.S. enterprises such as Mattel Group, Hasbro Group, and SEGA have heavily invested in China to compete for a share of the lucrative Chinese children's market (Dudarenok 2015). Given that there is little prior literature on cross-cultural differences in package design response to color and form, this study also provides theoretical and practical insights regarding the cultural context of the relationship between these factors and their impact on preference.

Literature review

Color and form of packaging and children

By attracting attention to a product (Creusen and Schoormans 2005; Schoormans and Robben 1997) and communicating information regarding product positioning, brand identity, and brand values (Ampuero and Vila 2006; Schoormans *et al.* 2010; Underwood 2003), packaging design represents an important marketing tool to communicate with consumers and affect their preference and purchase decisions at the point of sale (Clement 2007; Rettie and Brewer 2000; Simms and Trott 2010). As the critical components of design, color and form significantly influence aesthetic preferences and judgments of packaging design (Hekkert and Leder 2008; Huang and Lu 2016; Lindell and Mueller 2011; Westerman *et al.* 2013). For instance, consumers tend to use the height of the container as a simplifying visual heuristic to make a volume judgment (Raghubir and Krishna 1999). Packaging colors effectively help to create and amplify brand personality traits, capture consumers' attention, influence the likability and familiarity of a brand, and affect brand choice and purchase intent at the point of purchase (e.g., Kauppinen-Räsänen 2014; Labrecque and Milne 2012; Labrecque, Patrick, and Milne 2013).

The effect of color and form of packaging design is especially strong on children of and under 12 due to their tendency of being drawn to visually salient stimuli and immediate cues rather than conceptual themes and strategic thinking (Brée 2012; Broek, Lorch, and Thurlow 1996; Macklin 1996; Neeley and Schumann 2004; Peracchio 1992). Indeed, attractively colored

packaging may significantly influence children's selection or persuasion in the store (Hutchings 2003). For example, preschool children tend to select products with packaging in their favorite colors (Marshall, Stuart, and Bell 2006); chromatic color of packaging is found to have a positive impact on children's brand recognition (Bezaz 2014). Package form, in the format of curvilinearity (straight-lined or curved package shape), figurativeness (representativeness of package shape, such as a star-shaped or Teddy-Bear-shaped package), and complexity (simple or complex package shape), is also found to have strong impacts on children's preference of package design (Zhang 2014, 2018a, 2018b).

Age, children's cognitive development, and children's preference of package design

When researching children's preference of package design, it is crucial to consider the factor of age, which is associated with different stages of cognitive development of children. Developmental psychologist Piaget (1947, 1950) defines four stages of children's cognitive ability development associated with age: the sensory motor stage (age 0–2), the preoperational stage (age 2–7), the concrete operational stage (age 7–12), and the formal operational stage (age 12 and above). In the present study, we focus on children of age 3–12 because age three and age twelve represent two critical thresholds in consumer socialization: age three is the starting point of brand recognition and initial product selection under parental permission (McNeal 1992, 2007); and age twelve signifies children's entry to an advanced level as consumers who use brand names as an important cue in consumer judgments (Achenreiner and John 2003). Specifically, we compare children in two age groups according to their cognitive ability development: age 3–6 (i.e., the preoperational stage) and age 7–12 (i.e., the concrete operational stage).

Although research into age effect on children's perceptions of packaging has been scant, the very limited empirical investigations suggest that age may have a significant impact on children. For example, although preschoolers in general are likely to choose products of packaging in colors that match their own preferences, this tendency is especially strong among younger children (Marshall, Stuart, and Bell 2006). In particular related to preference, a recent study finds that

children's preference for certain shaped package design (i.e., curved and complex) increases with age; and an inverted-U relation is revealed in children's preference for figurative package design (Zhang 2018b).

Gender and children's preference of package design

Gender has been found to significantly affect visual preferences (Johnson and Knapp 1963; Lin and Bin 2011; McWhinnie 1970; Moss and Colman 2001). Researchers in visual aesthetics have revealed that women tend to be more attracted by color, especially brighter and less saturated ones (Schloss and Palmer 2011), and prefer less cluttered design with few graphics; by contrast, men tend to be drawn to animations and the interactive aspects of design, favor extensive graphics, and suggest more often yellow and less often red as least preferred than women do (Cyr and Bonanni 2005; Dittmar 2001; Simon 2001). In the realm of consumer behavior and marketing, gender differences in packaging perceptions have been under-researched. In particular, children's preference differences due to gender have not been explored until recently by Zhang (2014). Focusing on children aged 6–12, this research finds that girls show a greater preference for figurative package design than boys do; but no such gender differences are revealed in children's preference for curved package design.

Hypothesis development

Age difference in children's preference of package design by color versus form

Color and form are elementary stimulus encoding dimensions that have effects on the representation of visual stimuli and can be represented separately in memory and accessed independently (Hanna and Remington 1996). As early as infancy, children are able to discriminate object form and color (e.g., Franklin and Davies 2004; Slater, Morison, and Rose 1983; Teller, Civan, and Bronson-Castain 2004; Wilcox 1999). Brian and Goodenough (1929) first notice a developmental change in children's responses to color and form in a simple geometric patterns sorting task, and discover that children below age 6 sorted predominantly according to color and those above age 6 sorted predominantly according to form. Some researchers after Brian and Goodenough also find an

initial color preference with a switch to form sorting when investigating developmental changes in color-form responding (Corah 1964; Corah and Gospodinoss 1966; Suchman and Trabasso 1966). Other studies, despite failing to replicate Brian and Goodenough's findings, consistently confirm an increasing tendency with age for children to respond to form as compared to color (Corah 1966; Suchman 1966).

To explore the underlying mechanism of the color-form switch with age, maturational theorists argue that visual perception has a diffuse nature when children are young and gradually differentiates into specific forms as children get older. Therefore, the less mature mind of younger children would perceive color masses, which are more diffuse than form; as the mind matures and develops, the child is more capable of differentiating among forms (Colby and Robertson 1942). From the perspective of information processing, more recent research suggests that young children under age 7 are limited processors of information and tend to focus on a single dimension of a stimulus (John 2008; Piaget 1952; Sera and Millett 2011). For this reason, when categorizing products and brands, younger children are influenced by visual cues and reliant on dominant perceptual features such as color and size when compared with their older counterparts (John and Lakshmi-Ratan 1992; Macario 1991; Macklin 1996). Applied in the context of the present study focusing on children of 3–12 years in age, we hypothesize that:

H1: The effect of color (form) on package design preference will be greater (smaller) for children of age 3–6 than for children of age 7–12.

Gender difference in children's preference of package design by color versus form

Besides age differences, gender differences have been uncovered among children in their aesthetic preference (e.g., Salkind and Salkind 1997; Tuman 1999). Although there is a lack of research on gender difference in color-form preference, scattered previous studies find that more boys than girls respond to color rather than form as a basis for classifying stimuli (Honkavaara 1958; Katz 1975). It is suggested that components required in aesthetic preference, such as selective attention, memory, and classification, may have a gender-related element associated with

maturation (Salkind and Salkind 1997). Girls, who tend to mature earlier than boys, may exhibit different preferences reflective of their level of maturation and the accompanying cognitive skills which characterize that level along with the task demands of particular stimuli. Researchers also find that performance difference between boys and girls, especially upon the onset of puberty, is a general effect of physical maturation which occurs earlier for girls than for boys (Elkind 1981; Tanner 1970). Since form requires a higher level of maturation as compared to color (Colby and Robertson 1942), girls will be more likely to show preference by form than boys of the same age. Taken together, it is hypothesized that:

H2: The effect of color (form) on package design preference will be greater (smaller) for boys than for girls.

Age-gender interaction in children's preference of package design by color versus form

Moreover, researchers find significant biological differences associated with age, particularly the presence of the early hormones (e.g., androgen), which influence the development of visual ability regardless of gender (Berenbaum, Korman, and Leveroni 1995). In combination with gender difference as proposed by the maturational theory (Elkind 1981; Tanner 1970), this may indicate the existence of age-gender interaction. Indeed, evidence suggests that gender and age interaction may exist in children's color-form preferences. In an experiment on the color-form conceptual preferences of children, older girls are found less likely than younger girls to use color rather than form as a basis for conceptualization. However, no age difference is revealed in the response pattern among boys (Kagan and Lemkin 1961). Accordingly, it is predicted that:

H3: The age difference in the effect of color/form on package design preference will be greater for girls than for boys.

Methodology

Sample

Two separate 2 (color) x 2 (form) experimental surveys were conducted in urban areas of China and the U.S. at different locations, such as museums, schools, and summer camps. Due to the nature of data

collection locations, a convenience sampling technique was adopted. With parental consent (and/or teachers' consent whenever applicable) obtained, 837 valid responses and 761 valid responses from children of age 3–12 were collected in China and the U.S. respectively (see Table 1 for the participants' profile).

Experiment stimuli, measures, and pretest

Three groups of stimuli were created based on the 2 × 2 experimental design. Each group included two pairs of stimuli. Specifically, group 1 included one pair composed of a yellow round package and a blue square package, and the other pair of a blue round package and a yellow square package. Group 2 included one pair consisting of a blue round package and a green triangle package, and the other pair of a green round package and a blue triangle package. Group 3 included one pair containing a yellow round package and a green triangle package, and the other pair containing a green round package and a yellow triangle package. Each respondent was presented with one group of stimuli randomly selected from the three groups. If the packages preferred in both pairs within a group are in same color, color is considered the dominant dimension which affects the child's preference (i.e., preference by color); if the packages preferred in each pair are in same form, then form is considered the dominant dimension (i.e., preference by form).

In order to ensure that color and form were the only factors influencing children's preference of package design, other potential confounding factors, such as size, material, price, promotion, etc., were carefully controlled. Specifically, all the stimuli were presented in equivalent size, the same material, the same background, and viewed from the same perspective. No any other information, such as labels or brand names, was involved with the stimuli. Three versions of original English questionnaire were developed, with each version containing one group of stimuli. The questionnaires were then translated into Chinese and back-translated into English. The back-translated

questionnaires were compared with the original English versions and then modified and tested to ascertain the accuracy of the Chinese questionnaires.

A pretest was conducted among 52 Chinese and U.S. children (13 boys and 13 girls from each country). Pretest results confirmed that color and form were the reasons for the participants' choices of preference. We also interviewed 32 parents in China and 31 parents in the U.S. to check whether a potential confounding factor of familiarity may exist. Interview results confirmed that familiarity was not a concern for this study's stimuli.

Procedure

Data were collected in a face-to-face setting in China and the U.S. For children of age 6 and above, a self-reported survey was employed. For children under age 6 who could not complete the self-reported survey on their own, we adopted personal interview survey method, which followed a procedure similar to the one for those aged 6–12 but provided assistance from parents/teachers and/or the survey administrator in the recording of children's basic information (i.e., gender and age) and their preference choices.

With parents/teachers and the survey administrator present, age and gender were first recorded in all cases. Next, two pairs of package images within one group of stimuli randomly selected from the three versions of questionnaires were presented to the participants, who were asked to choose their preferred one in each pair. Besides specifying the instructions, the survey administrator explained to the participants and the parents/teachers that (1) participation was completely voluntary; (2) if the children decided to participate, there were no right or wrong answers and that their answers were personal choices; and (3) children were free to stop and quit at any time. After seeing the package images, children of age 6 and above chose and circled their preferred packages on the questionnaire by themselves. Children under age 6 were asked to point at the packages they preferred, and the

Table 1. Participants' profile.

		Age										Total	Percentage within culture
		3	4	5	6	7	8	9	10	11	12		
China	F	10	29	35	40	35	56	41	53	42	38	379	45.3%
	M	18	32	31	39	43	69	58	59	44	65	458	54.7%
U.S.	F	30	43	52	44	43	51	47	40	33	25	408	53.6%
	M	18	33	32	33	40	39	38	41	56	23	353	46.4%

parents/teachers or the survey administrator recorded their responses on the questionnaire. After completing the survey, every participant was rewarded with a surprise gift. In order to avoid possible order and position biases, all stimulus pairs were presented in random order and the position/sequence of stimuli in each pair was also randomized (Fellows 1967; Hunt, Sparkman, and Wilcox 1982).

Results and discussion

With datasets from China and the U.S., two separate logistic regressions were conducted as all variables are categorical. Both the logistic regression models were composed of dependent variable (DV) of color-form preference and independent variables (IVs) including age group (age 3–6 vs. age 7–12), gender, and the interaction term of age group x gender. The results of the regressions are compiled in Table 2.

As shown in Table 2, age effect was consistently found for both China and the U.S. ($p = .008$ for China and $.026$ for the U.S.). Significantly more children aged 3–6 from both cultures made their choices of preference by color as compared with their older counterparts. As shown in Figure 1, the percentages of younger children who based their preferences by color are 64.5% for China and 71.2% for the U.S.; while the corresponding percentages of older children are 58.2% and 60.1% for China and the U.S., respectively. Conversely, the percentages of younger children who based their preferences by form are 35.5% for China and 28.8% for the U.S.; while the corresponding percentages of older children are 41.8% and 39.9% for China and the U.S., respectively. Therefore, H1 is supported for both cultures.

Nevertheless, gender effect was revealed for China only ($p = .042$ for China and $.940$ for the U.S.). As shown in Figure 2-A, more Chinese boys (61.6%) than girls (58.0%) made their choices of preference by

color. Conversely, less Chinese boys (38.4%) than girls (42%) were influenced by form. However, the percentages of U.S. boys' and girls' color-form preferences are almost equal (64.7% of girls and 63.7% of boys for preference by color; 35.3% of girls and 36.3% of boys for preference by form) (Figure 2-B). Therefore, H2 is only supported in the Chinese dataset.

Likewise, age group x gender interaction was found for China only ($p = .037$ for China and $.901$ for the U.S.). As shown in Figure 3-A, the percentage of Chinese girls who made their choices of preference by color drops from 68.4% to 53.6% when they get older. However, no significant change was revealed among Chinese boys (60.8% for younger boys and 61.8% for older boys). In the case of the U.S., almost equivalent changes with age were observed for girls (from 71.0% for younger girls to 60.3% for older girls) and boys (from 71.6% for younger boys to 59.9% for older boys) (Figure 3-B). Therefore, H3 is also only supported in the case of China.

Our results for H2 and H3 are surprising, in that the extant literature in developmental psychology suggests gender differences, yet we found significant differences for the Chinese sample only. Prior studies were conducted in Western settings (Honkavaara 1958; Katz 1975), so one might expect significant gender differences in the case of the U.S., if not both cultures. Nevertheless, the research on gender differences in color and form responses is scant, and many of the studies are quite old. Our results suggest that the relationship between gender and color/form responses in the context of packaging is complex and that cultural differences in response, previously under-researched, may be significant. There may be other reasons for the lack of full support of previous studies. For example, in the earlier studies, children responded to two-dimensional graphics (e.g., geometrics patterns); while in the present study, the stimuli were images of more realistic, three-dimensional packages. Indeed, stimulus characteristics (e.g., solid figures vs. two-dimensional surfaces and figures) also affect color-form response among children (Katz 1975). Although the effect of stimuli in the present study is unknown and speculative, it may be one factor that can be explored in future research to gain a fuller understanding of color-form preference of packaging, and specifically, response differences due to gender.

Indeed, general cultural differences in color and form preference have been revealed between China

Table 2. Parameter estimates of logistic regression.

	China		U.S.	
	Estimates	P value	Estimates	P value
Intercept	-.144	.244	-.416	.002
Age group ^a	-.630	.008	-.480	.026
Gender ^b	-.339	.042	.014	.940
Age group x Gender	.672	.037	-.041	.901

^aThe reference category is age group of 3–6 years.

^bThe reference category is male.

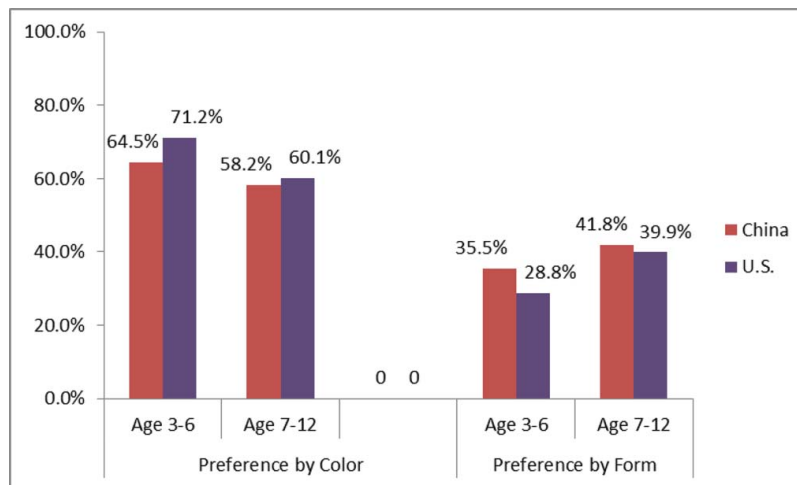


Figure 1. Age effect on children's color-form preferences of package design.

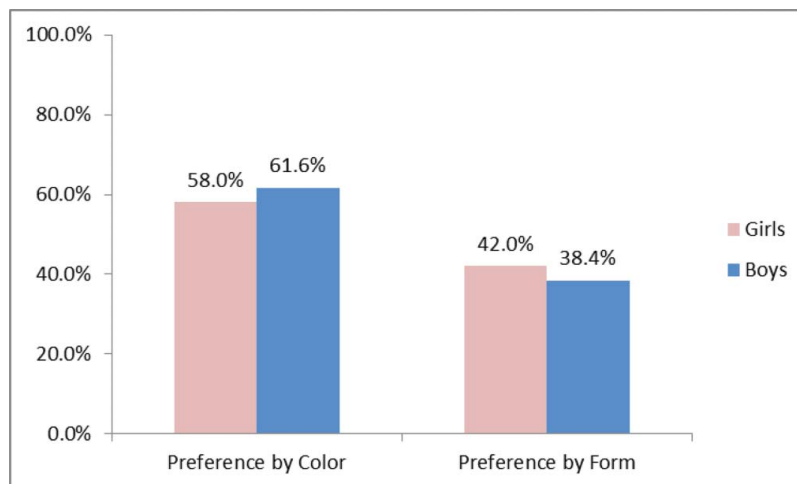


Figure 2-A. Gender effect on Chinese children's color-form preferences of package design.

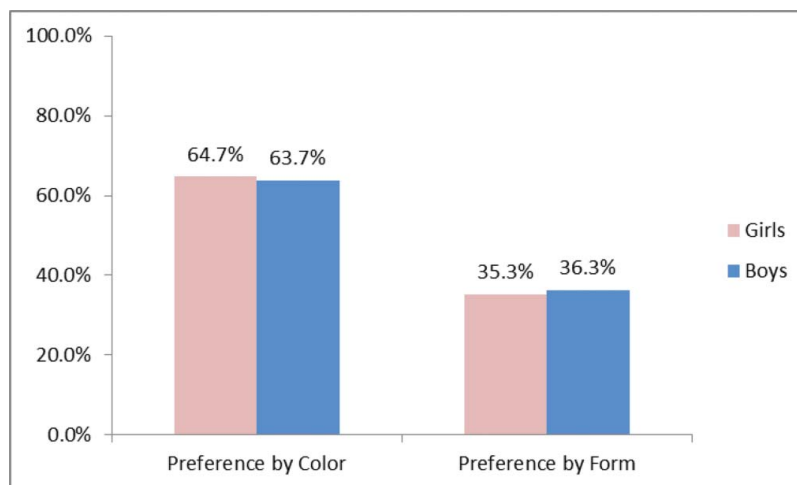


Figure 2-B. Gender effect on U.S. children's color-form preferences of package design.

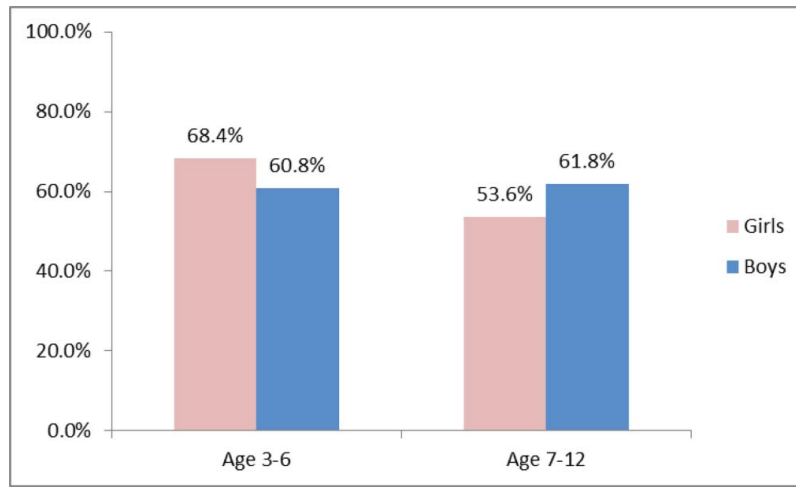


Figure 3-A. Age group x gender interaction on Chinese children's package preferences by color.

and the U.S. For example, using color symbolism, Saito (1996) suggests that Chinese show a greater preference for white and whitish colors than Americans do, perhaps because white symbolizes cleanliness, purity, and the sun, which are highly valued in China. Similarly, Chinese prefer red more than Westerners, perhaps due to its role as a symbol of good luck in China (Hurlbert and Ling 2007). Regarding form preference, cultural differences are also revealed between China and the U.S. For instance, Chinese tend to prefer rounded shapes while Americans are more likely to favor angular shapes (Henderson *et al.* 2003; Zhang, Feick, and Price 2006). Chinese aesthetically prefer higher levels of complexity than their U.S. counterparts (Farley and Ahn 1973; Singh, Zhao, and Hu 2005). Gender differences have also been reported in hue preference among children: girls

of 3–12 in age tend to prefer pink and purple, whereas boys of the same age range tend to prefer red and blue (Iijima *et al.* 2001; Picariello, Greenberg, and Pillemer 1990). This phenomenon may be explained by the exposure to stereotypically colored gender-specific toys (LoBue and DeLoache 2011) or with an ecological theory, which claims that color preferences are determined by preferences for correspondingly colored objects (Palmer and Schloss 2010; Palmer, Schloss, and Sammartino 2013). Particularly related to children's preference of package design, a pioneering recent study not only discovers that Chinese children generally have a greater preference for figurative stimuli than U.S. children, but also reveals partial support for cultural difference between boys and girls in their preferences for figurative package design (Zhang 2014).

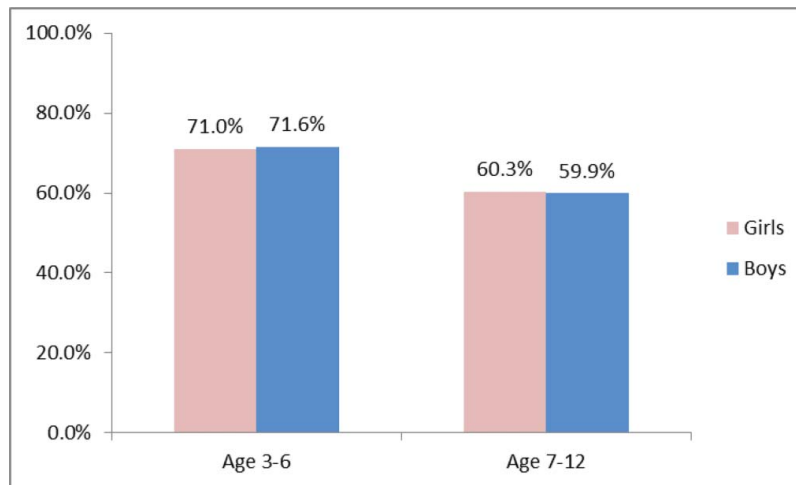


Figure 3-B. Age group x gender interaction on U.S. children's package preferences by color.

When it comes to age-gender interaction, scattered studies in the extant Western literature propose that gender differences in saturation of color do not develop until the beginning of adolescence (12–13 years) and become clearly apparent by adulthood (17–18 years), being completely absent for young children (Child, Hansen, and Hornbeck 1968). Also, Salkind and Salkind (1997) find that younger boys and girls (Grade 1–2) show similar preferences for abstract/realistic art works but a sizable difference exists among older boys and girls (Grade 5–6), with older girls having more realistic preferences than younger girls, and older boys having more abstract preferences than younger boys.

Since there are no existing studies of cultural differences in the relationship between gender and color/form responses and in the age-gender interaction regarding color/form responses, our findings provide an initial insight in this previously unexplored area. It is speculated that the cultural differences revealed in the present study may be related to age and gender differences between Chinese and American children with regards to the level of maturation and cognitive development. This also may be accounted for by the influence of psychosocial variables. Specifically, the cultural differences revealed in this study may be related to social-environmental input differences among children of different age and gender in the two distinctive cultures. While our research provides preliminary descriptive insights into the phenomena observed in the present study, we are not able to pinpoint the reasons for the observations at this stage and thus call for further investigations into the mechanism behind to explain for the cultural differences.

Theoretical and managerial implications

Drawn from the developmental psychology literature on color and form perception and preference, the present study aims to explore children's color-form preference of package design. We develop hypotheses on age and gender differences as well as age-gender interaction in children's package preference by color versus form. The research contributes to the color-form preference literature and the packaging and children's consumer behavior literature by clarifying the complex relationships

between age, gender, and color-form preference, and also provides insights to practitioners responsible for packaging targeted at children in the global markets. The results also make broader contributions to theory in product design and consumer product marketing.

Theoretical implications

Specifically, this research contributes to the extant literature in three aspects. First, in line with previous studies in developmental psychology, this study finds that younger children are more dependent on color when deciding on their preference of package design. This result is observed in children from both China and the U.S. This is a significant addition to the color-form preference literature. Although an increasing tendency with age for children to respond to form as compared to color has been confirmed in many studies (e.g., Brian and Goodenough 1929; Corah 1964, 1966; Corah and Gospodinoss 1966; Suchman 1966; Suchman and Trabasso 1966), some African-based studies find that children from Nigeria and Ghana do not show the age relationship with color-form preference typical of Euro-American societies (Davidoff 1972; Suchman 1966), suggesting cultural differences may exist in developmental color-form preference. The results of our study, however, indicate the existence of a common color-form response pattern associated with age between China and the U.S. even though they are culturally distant from each other.

Second, although Chinese and U.S. children share the same developmental color-form preference pattern, the results of this study reveal significant cultural differences regarding gender effect. No gender difference was found between U.S. boys and girls. By contrast, Chinese boys show a statistically significant greater preference by color as compared with Chinese girls. This finding makes important contributions to our understanding of gender difference in color-form preference. As mentioned in results and discussions, some previous studies in Western settings uncovered gender differences (Honkavaara 1958; Katz 1975), so one might expect significant gender difference in the case of the U.S. Although we hypothesized gender difference based on this literature as well as the maturational theory and the information processing theory, our results of no gender difference in the U.S. sample suggest complexity of this stream of research. The

reveal of gender difference among Chinese children further adds to the complication of this research line, besides increasing our understanding of cultural difference in gender effect on children's color-form preference.

Third, significant cultural differences regarding age-gender interaction are also found in this study. Again, U.S. boys and girls show no age-gender interaction in their color-form preference. However, the change in the color-form preferences of packaging between Chinese younger girls and older girls is significantly greater than that of Chinese boys, who actually do not show much age difference. This further extends our understanding of the developmental color-form preference and suggests that age-gender interaction is a complex phenomenon which gets even more complicated when cultural settings change.

Managerial implications

Children have become a more and more important marketing target in a highly competitive market. Marketers must wisely differentiate their packaging of products from those of their competitors in the marketplace. To secure their share in the children's market, it is crucial that practitioners understand how children of different age and gender as well as cultural background respond to package design as they develop and mature. Our findings provide important practical implications for marketers responsible for packaging decision making in a cross-cultural context.

While color may be important to children in general, this study finds that younger children's preference (age 3–6) is dominated by color and older children's (age 7–12) by form. We suggest that marketers should adapt their strategies of differentiation to children's age. Specifically, color is an especially critical strategic decision for packaging targeted at younger children. Therefore, it would be wise for marketers to focus more on color when designing packages for younger children and consider adopting colors attractive to children, such as pink, purple, and yellow, as dominant color of packaging (Marshall, Stuart, and Bell 2006). For packages targeted at older children (age 7–12), marketers should also consider attractive forms because the chance of preference by form increases when children get older.

Meanwhile, practitioners should be cautious of cultural differences when selling to the global

marketplace and designing products for different and possibly unfamiliar cultures. If the package design is targeted at the U.S. children's market, marketers should concentrate on age differences as discussed above. However, if the target market is Chinese children, professionals should be mindful of differences due to gender effect and gender-age interaction. The present study finds that Chinese boys' preference of package design is dominated by color regardless of change in age. Therefore, it is recommended that practitioners should focus on color of packaging targeted at Chinese boys. Nevertheless, if the target market is Chinese girls, it is crucial that marketers keep in mind the significant difference between younger girls and older girls. Since our findings suggest that color is significantly more effective in affecting package preference of younger Chinese girls (age 3–6) than older Chinese girls (age 7–12), it would be wise for marketers to differentiate strategies by emphasizing attractive colors of packaging for younger Chinese girls and adopting interesting forms for older Chinese girls.

Limitations and future research

Notwithstanding theoretical and practical contributions, we acknowledge limitations and propose directions for future research. To begin with, we included a very limited number of stimuli in this study. Only three colors and three forms were adopted for the stimuli. Thus, further research may enhance the validity and generalization of our findings, by including more colors and forms. Future studies could also extend this research stream by taking into account the relative impacts of the three color dimensions (hue, saturation, and brightness) on children's preference of package design.

Next, only a limited age range (3–12) and two cultures (China and the U.S.) were considered. While the age range included in this study is actually much broader than many previous studies in the related literature, it would be enlightening to extend this research line by exploring children of other age groups, such as adolescents. Also, future researchers could consider replicating this study in other cultures in order to extend our understanding of culture differences on a larger scale.

Furthermore, to our surprise, this study finds gender effect and age-gender interaction only in the Chinese sample although previous studies we used to

develop the corresponding hypotheses were conducted in Western settings. We speculate that this may be due to the fact that previous studies are scant and quite old. It is also speculated that the surprising results may be caused by the difference between our stimuli and those in previous studies. Future researchers may consider methodological studies to explore possible stimulus effects on children's preference of package design. Also, while our research provides initial insights of cultural differences in the relationship between age and gender, and color/form responses, we are not able to identify the reasons for the phenomena observed. Future studies are called for to explore the mechanism behind and scientifically explain for these cultural differences.

Finally, while our study reveals interesting findings regarding age, gender, and culture, it did not consider other demographic factors, such as education, family income level, and so on. It is recommended that future researchers could delve into possible differences due to dissimilarities in demographic factors besides age, gender, and culture. Indeed, some early developmental psychologists find that children differing in ethnicity and education show significant differences in matching test by color or form (Colby and Robertson 1942; Serpell 1969). Extension to this direction would greatly increase our understanding of individual demographic background's influence on children's color-form preference of package design.

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