Using the Photo Album Test, To Scale a Visitor Attention in Car Showroom

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A R T I C L E I N F O	A B S T R A C T
	Colour plays a vital role in visual perception, especially in the fields such as marketing, exhibitions and branding image. Colour is one of interior design elements, which the colour had a significant impact on the behaviour of human beings, within the interior spaces. This study aims to set a numeric scale, to measure the visitor attention into the auto-show exhibition space, by testing the effect of colour as an independent variable, on attracting visitor attention as a dependent variable. Our Photo Album is an instrument of projective technique to obtain the maximum level of validity and reliability of data collection during interviews. The interview recorded the respondents' impressions by manipulations of foreground and background colours. The data are recorded in the tables and analysed accordingly. The results show that there is a significant relationship between the colour effect and attracting the visitor attention. The technique developed and the result of the study will provide a base for future studies.

1. Introduction

There are many phenomena recognized as natural facts in our daily observations, but we can't adopt some of such phenomena as references for the scientific research purposes, particularly in the Applied Sciences fields, because they are not subject to empirical scale

(un-measurable phenomenon) (Saylor 1984). In this paper the authors set a numerical scale for the relationship between the colour effects and the visitor attention within the interior space of car showroom.

According to (R.Shadish, Cook et al. 2001) the experiment is defined as "a test under controlled conditions that is made to demonstrate a known truth, examine the validity of a hypothesis or determined the efficacy of something previously untied". The photo album design is based on Itten Colour System, aims to test the impact of the independent variable on the dependent variable as described in the text. This paper is attempting to develop a quantitative scale to measure the attention of the visitor within the internal space of the car showroom. This test is a part of an in-depth study entitled "*The Impact of Display Design on Visitor Attention in Proton Showroom, Malaysia*". Due to the scarcity of the references in the field of auto-showroom design from the academic perspective, the current study is attempting to fill the gap of knowledge. This research will catalyse future studies in the exhibitions and showroom design. In this test the impartial method is adopted, in order to ensure a good level of validity and reliability. This paper contained the introduction, the methodology (the checklist design and sampling strategy), the data analysis, the result and conclusion.

2. Methodology

In order to achieve a sufficient connection with the respondents, and allow to record the observations during the interview; the test methodology adopted the face-to-face interview of respondents who have been determined (in population). The researchers do not resort to use the questionnaire technique in spite of the ability to frame the test as a questionnaire, or other common methods, instead the face-to-face interview technique is used, to ensure more clarity and helps the respondents to answer positively (Rawlins 2008). The hypothesis of this test is "There is a significant relationship between the colour effect, and attracting a visitor's attention within the car showroom". Colour which is one of the design elements (McClurg-Genevese 2009), is an independent variable to measure the impact of and the visitors' attention which is the dependent variable in the study.

2.1 The Checklist Test Design

The adoption of the projective method to obtain the data, is the most appropriate way to do the test interview. Some scientific experiments use this kind of techniques, especially the test

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related to marketing, psychological and sociological fields such as: Rorschach Test, Wechsler Intelligence Scale, Thematic Appreciation Test. Forer Sentence Completion Test, Bender Gestalt Test, Draw-a-Person Test (Carr 1968).

Regardless of the Reliability of Rorschach Inkblots Test, The Rorschach Test is considered as a Projective Technique, based on testing the participants by using 10 cards of ink-bolts (Meloy 1991) as in Figure 1.
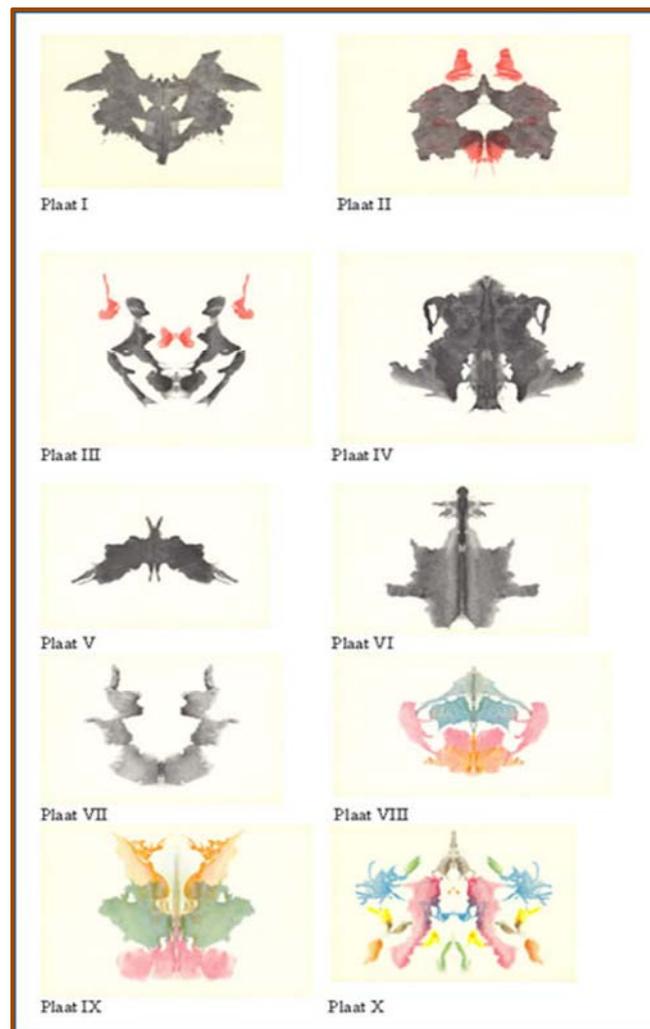
Figure 1: Rorschach inkblots (Rorschach 1921).

The 10 inkblot cards contain random irregular shapes which are shown to the respondents who are asked some projective questions related to the shapes, such as "what might this be" with several multiple-choice answers for each cards and answers are coded accordingly. The data according to (Elfhag 2003) are analysed and the mental states of the respondents are diagnosed.

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The researcher designed the (Photo Album Test) based on Itten Colour Wheel, using 19 images in order to test the hypothesis (Figure 2).
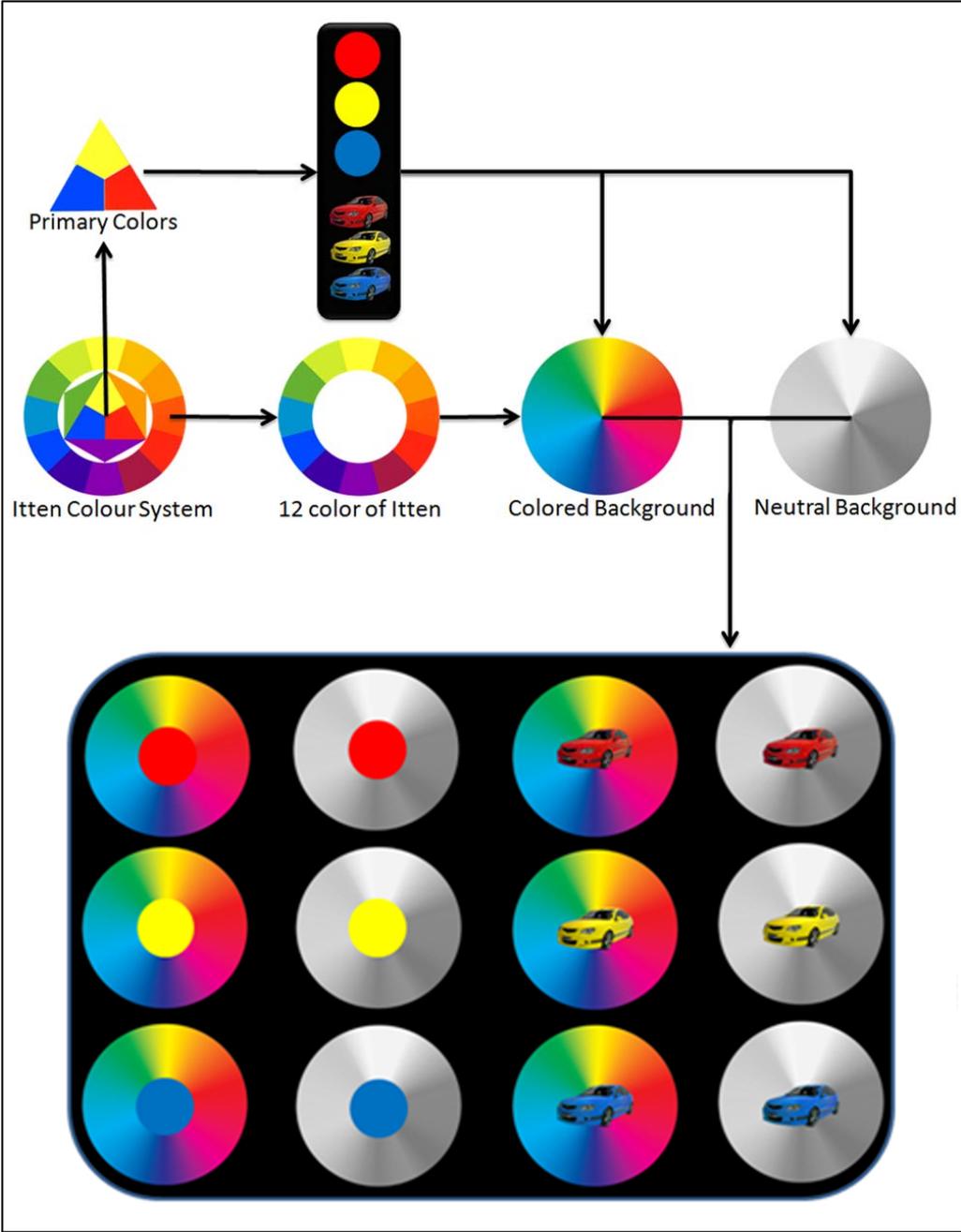
Figure 2: The test design developed by the authors, based on Johannes Itten System.

Itten Colour System is a colour wheel consists of 12-hues colours as in Figure 2. This colour wheel was developed from the primary colours yellow, red, and blue. The three primary colours placed in an equal triangle; yellow at the top, red in the lower right, and the blue in the lower left. About this triangle Itten inscribed a regular hexagon, resulted from mixing the primaries to obtain the three secondary colours orange, green and violet. The six colours

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(primaries and secondaries) mixed carefully to generate a 12 sequencesed tone of colours such a rainbow or natural spectrum (Itten 1970).

Shape	Color	NEUTRAL BACKGROUND		COLORED BACKGROUND		COMPARISON	
SPOTS	RED	Q 1		Q 2		Q 3	
	YELLOW	Q 4		Q 5		Q 6	
	BLUE	Q 7		Q 8		Q 9	
CARS	RED	Q 10		Q 11		Q 12	
	YELLOW	Q 13		Q 14		Q 15	
	BLUE	Q 16		Q 17		Q 18	
SHOWROOM			Q 19	IS THE CAR (B) IS CLEAR?			
			Q 20	WHAT ABOUT THE CAR (G)? ... IS IT CLEAR TOO?			
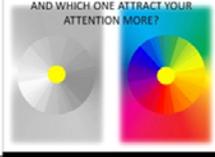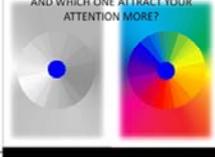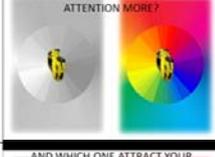
Figure3: the test images with questions (Q1-Q20),
(the last image enhanced from http://www.bmw-oman.com 2009).

Questions related to the images are formulated in order to carry out the test. The present study has three main tests. The first one is to test the relationship between colour red, yellow and blue with coloured background. Follow by the image of a red car, a yellow car and a blue

car with a neutral background. The third step is the comparison between the first and the second step, *see* Figure 3.

2.2 Sampling Strategy

2.2.1 The Test Plan

The album test is followed by the interview in 4 predetermine locations. Tables 1, 2, 3 and 4 are filled in and analysed statistically.

2.2.2 The Scope

This test focuses on the Proton Showrooms, based on the following reasons: Malaysia is one of important automotive makers in Asia, where the study is conducted.   There is a variety of auto-manufacturing and assembly such as Proton, Perodua and Naza (Rosli 2006).   In addition the Proton Company has the main showroom in Shah Alam (Crystal Showroom) and many focal point showrooms as well as dealerships around Malaysia (http://www.proton-edar.com.my 2012).   The research focuses on four showrooms in Malaysia as a suggested field of data collection as shown in Figure 4:

Kuala Lumpur (Proton showroom).

Selangor, Shah Alam, main showroom (Crystal Showroom).

Penang, zone (a) Proton Showroom Georgetown.

Penang, zone (b) Proton Showroom Auto City (Butterworth).

Figure 4: The Locations of Proton Showroom in Malaysia.

2.2.3 The Population

The participants in general are adult visitors who come to the showrooms. They hold driving licenses which verify their interest to visit showrooms.

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2.2.4 The Sampling and Measurement

The checklist test procedure starts with face-to-face interview test for 40 interviewees as a total (10 interviewees for each place of the four zones), according to the sample size.

The justifications for focusing on 4 sites and 10 respondents on each site are:
- Statistically: Number 10 transferable to percentage easily as well as getting more accurate statistical results.
- Time Control: The interview time with each respondent 15 - 20 minutes, which mean 10 interviews for each site (around 3 hours), taking into considerations the breaks.
- Interviews Locations: the selected locations as the map shown (Figure 4) are not close to each other, which required doing the interviews within 1 work day for each site. And
- According to (Aubel 1994) the number of respondents should be between (6-10) for each group, as a general agreement, this average is suitable for all participants to discuss and contribute their ideas.

The summations of the correct responses are calculated to compare with the (Typical Answers). The Typical Answers method is commonly used approach, especially with projective techniques, as a scale for the respondent answers (standards) due to hypothesis framework. The final percentage of the correct answers are calculated in order to find the result (of 40 respondents); refer to table 1, 2, 3 and 4.

2.3 The Test Justifications

In order to obtain the acceptable level of validity, the researchers deliberately:

Adopt the Itten Colour System to design the test album, where the test contained three primary colours (Red, Yellow, blue) for cards and cars, with neutral (greyscale) colours of background, and with coloured background according to the Itten System.

Avoid a shadow behind the shapes (spots & cars) in order to get more neutrality and avoid biases. The shadow will make outlines that led to increases in attracting attention to the shape.

Make the background colours overlap-gradually and avoid intervals among the colours of Itten's wheel, to ensure the sign randomize. And avoid the suggestions that can lead to a state of illusion, or colour noise pollution (Kodamaa 1990) which adversely affect the reliability of test results.

Table1: The checklist test result for Kuala Lumpur (Proton showroom).

Colour		Q	Questions	Typical Answer	Per 10	%
SPOT QUESTIONS	RED	Q1	The red spot with neutral background	√	10	100%
		Q2	The red spot with coloured background	X	8	80%
		Q3	Comparison between two cases	1	9	90%
	YELLOW	Q4	The yellow spot with neutral background	√	4	40%
		Q5	The yellow spot with coloured background	X	3	30%
		Q6	Comparison between two cases	1	4	40%
	BLUE	Q7	The blue spot with neutral background	√	10	100%
		Q8	The blue spot with coloured background	X	9	90%
		Q9	Comparison between two cases	1	10	100%
CAR QUESTIONS	RED	Q10	The red car with neutral background	√	9	90%
		Q11	The red car with coloured background	X	9	90%
		Q12	Comparison between two cases	1	9	90%
	YELLOW	Q13	The yellow car with neutral background	√	5	50%
		Q14	The yellow car with coloured background	X	4	40%
		Q15	Comparison between two cases	1	4	40%
	BLUE	Q16	The blue car with neutral background	√	9	90%
		Q17	The blue car with coloured background	X	10	100%
		Q18	Comparison between two cases	1	10	100%
EXTRA QUESTIONS		Q19	Did the car (B) is clear?	√	9	90%
		Q20	What about the car (G)?, is it clear too?	X	9	90%

In addition to the cars (the study related) the researchers used the coloured spots (red, yellow, blue) circular shape, because the circle is the simple systematic shape that can be used as a centre, and the wheel colours distribute more regularly as shown in Figure 2.

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Table2: The checklist test result for Selangor, Shah Alam, main showroom (Crystal Showroom).

Colour		Q	Questions	Typical Answer	Per 10	%
SPOT QUESTIONS	RED	Q1	The red spot with neutral background	√	10	100%
		Q2	The red spot with coloured background	X	9	90%
		Q3	Comparison between two cases	1	10	100%
	YELLOW	Q4	The yellow spot with neutral background	√	6	60%
		Q5	The yellow spot with coloured background	X	5	50%
		Q6	Comparison between two cases	1	5	50%
	BLUE	Q7	The blue spot with neutral background	√	10	10%
		Q8	The blue spot with coloured background	X	9	90%
		Q9	Comparison between two cases	1	10	10%
CAR QUESTIONS	RED	Q10	The red car with neutral background	√	10	100%
		Q11	The red car with coloured background	X	9	90%
		Q12	Comparison between two cases	1	9	90%
	YELLOW	Q13	The yellow car with neutral background	√	5	50%
		Q14	The yellow car with coloured background	X	5	50%
		Q15	Comparison between two cases	1	4	40%
	BLUE	Q16	The blue car with neutral background	√	10	100%
		Q17	The blue car with coloured background	X	9	90%
		Q18	Comparison between two cases	1	9	90%
EXTRA QUESTIONS		Q19	Did the car (B) is clear?	√	10	100%
		Q20	What about the car (G)?, is it clear too?	X	10	100%

Table3: The checklist test result for Penang, zone (a) Proton Showroom Georgetown.

Colour		Q	Questions	Typical Answer	Per 10	%
SPOT QUESTIONS	RED	Q1	The red spot with neutral background	√	10	100%
		Q2	The red spot with coloured background	X	8	80%
		Q3	Comparison between two cases	1	9	90%
	YELLOW	Q4	The yellow spot with neutral background	√	2	20%
		Q5	The yellow spot with coloured background	X	2	20%
		Q6	Comparison between two cases	1	2	20%
	BLUE	Q7	The blue spot with neutral background	√	9	90%
		Q8	The blue spot with coloured background	X	9	90%
		Q9	Comparison between two cases	1	9	90%
CAR QUESTIONS	RED	Q10	The red car with neutral background	√	10	100%
		Q11	The red car with coloured background	X	9	90%
		Q12	Comparison between two cases	1	10	100%
	YELLOW	Q13	The yellow car with neutral background	√	3	30%
		Q14	The yellow car with coloured background	X	4	40%
		Q15	Comparison between two cases	1	4	40%
	BLUE	Q16	The blue car with neutral background	√	10	100%
		Q17	The blue car with coloured background	X	9	90%
		Q18	Comparison between two cases	1	9	90%
EXTRA QUESTIONS		Q19	Did the car (B) is clear?	√	10	100%
		Q20	What about the car (G)?, is it clear too?	X	9	90%

Table4: The checklist test result for Penang, zone (b) Proton Showroom Auto City (Butterworth).

Colour			Q	Questions	Typical Answer	Per 10	%
SPOT QUESTIONS	RED		Q1	The red spot with neutral background	√	10	100%
			Q2	The red spot with coloured background	X	10	100%
			Q3	Comparison between two cases	1	10	100%
	YELLOW		Q4	The yellow spot with neutral background	√	0	0
			Q5	The yellow spot with coloured background	X	1	10%
			Q6	Comparison between two cases	1	1	10%
	BLUE		Q7	The blue spot with neutral background	√	9	90%
			Q8	The blue spot with coloured background	X	9	90%
			Q9	Comparison between two cases	1	9	90%
CAR QUESTIONS	RED		Q10	The red car with neutral background	√	9	90%
			Q11	The red car with coloured background	X	9	90%
			Q12	Comparison between two cases	1	9	90%
	YELLOW		Q13	The yellow car with neutral background	√	5	50%
			Q14	The yellow car with coloured background	X	4	40%
			Q15	Comparison between two cases	1	4	40%
	BLUE		Q16	The blue car with neutral background	√	9	90%
			Q17	The blue car with coloured background	X	8	80%
			Q18	Comparison between two cases	1	9	90%
EXTRA QUESTIONS			Q19	Did the car (B) is clear?	√	10	100%
			Q20	What about the car (G)?, is it clear too?	X	9	90%

3. The Data Analysis

According to the homogeneous sample size (40 respondents) of the test, the researchers resorted to using the Typical Answers due to the hypothesis requirements.   Mean and ANOVA (the analysis of variance) are used to analyse the 4 groups of the respondent's answers of 20 questions. The results are shown in Table 1, 2, 3 and 4.   The summary of the results from Tables 1, 2, 3 and 4, is shown in Table 5.

4. Discussion of Results

The results show that the red, yellow and blue dots with neutral backgrounds attract more attention than the colourful backgrounds. Similarly the red, yellow and blue cars with a neutral background attract more attention than the colourful backgrounds. Table 5 shows that the mean is 76% and Table 6 shows the analysis of the variance. The results correspond with the hypothesis of the study

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Table 5: The Results.

Q	TABLE 1	TABLE 2	TABLE 3	TABLE 4	Percents	OBSERVATIONS
Q1	10	10	10	10	100%	
Q2	8	9	8	10	87.5%	
Q3	9	10	9	10	95%	
Q4	4	6	2	0	30%	abnormal value
Q5	3	4	2	1	25%	abnormal value
Q6	4	5	2	1	30%	abnormal value
Q7	10	10	9	9	95%	
Q8	9	9	9	9	90%	
Q9	10	10	9	9	95%	
Q10	9	10	10	9	95%	
Q11	9	9	9	9	90%	
Q12	9	9	10	9	92.5%	
Q13	5	5	3	5	45%	abnormal value
Q14	4	5	4	4	42.5%	abnormal value
Q15	4	4	4	4	40%	abnormal value
Q16	9	10	10	9	95%	
Q17	10	9	9	8	90%	
Q18	10	9	9	9	92.5%	
Q19	9	10	10	10	97.5%	
Q20	9	10	9	9	92.5%	
THE MEAN OF RESULT					76%	

Table 6: Analysis Of Variance (ANOVA).

SUMMARY

Groups	Count	Sum	Average	Variance
TABLE 1	20	15.775	0.78875	0.057794
TABLE 2	20	16.4	0.82	0.049053
TABLE 3	20	14.7	0.735	0.097132
TABLE 4	20	14.4	0.72	0.113263

ANOVA

Source of Variation	SS	df	MS	F	P-value
Between Groups	0.130211	3	0.043404	0.547263	0.651499
Within Groups	6.027594	76	0.07931		
Total	6.157805	79			

The result reveals that some abnormal or extreme values in the FAQ: (Q 4, Q 5, Q 6) and (Q 13, Q 14, Q 15), respectively, and those abnormal values are located in the area of yellow colour groups, *see* Figures 2 and 3. The reason is due to the visual perception of the yellow

items with white backgrounds is less than the black backgrounds because of the contrast (Younes, Truck et al. 2005).

The contrast of the background with foreground colours, has been proved significant effect for visual perception. The result corresponds to the study made by (Fairuzzana Padzi and Fuziah Ibrahim 2012). (Hopkinson and Longmore 1959) claims also that the colour contrast between the objects and the environment result to holding the attention, either by their brightness, colour, texture or form.

5. Conclusion

The results of this study suggest that colour has the power to attract the attention of the visitors, to the exhibits within the interior spaces of exhibitions. The Photo Album Test shows that there is a significant relationship between exhibits (vehicles) colour and showroom interior colours as an exhibition backgrounds. The colourful backgrounds usage leads to difficulties of visual perception and weak attraction to the exhibits unlike, the use of neutral colours such as Porsche Museum\ Stuttgart, achieve a maximum attraction to the majority of exhibits.

6. Acknowledgements

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