ERASMUS UNIVERSITEIT ROTTERDAM
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Effect of Cognitive Style and Involvement Level on Recall

Different Product Information

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Abstract

The ways that individuals process information are different across people. When they face a certain kind of product information format, they usually have different reactions; it can even affect their ability to recall the content. In this study relationship among product information presentation format, cognitive style (visualizer and verbalizer in precise), involvement level is examined. Order effect and size effect are expected for word clouds and list of statements (information presentation format). Also size, order and cognitive styles are considered to influence recall rate that is intervened by involvement level. As a result, it was found that the both size effect and order effect are partially supported. However the outcome effect of cognitive style on recall rate did not match as was predicted, moreover involvement level did not show any effects except for the dimension of hedonic value, it somehow has negative relationship with the recall rate when the product investigated was hotel.

Contents

Introduction

When customers purchase products in their daily life, they see all kinds of product information. Some of them are listed, some of them are put in a narrative way while some other of them combine words with pictures. It is reasonable to assume that different formats of product information may perform differently among products and customers. This study investigates the relationship among cognitive style, involvement level and product information presentation format by having a test on product information recall. The product information presentation formats are word cloud and list of statements. A word cloud is a concise way to summarize the main ideas of a content or text with most frequently used words. Nowadays word clouds are increasingly used to draw the main idea of some written material, speech or even the board committee documents (Atenstaedt, 2012). As companies have there own right to choose the way of information being displayed. It is assumed that there is high potential that word cloud can serve as product information presentation format. The product information-presenting format could be done differently for customers with different thinking styles or for customers at different stages in the purchase process (relate to involvement level).

To examine the causes of the different recall rate among respondents, involvement level towards a product and the cognitive style of a person should not be ignored. Research of Okechuku (1992) reported 'involvement levels do affect behavioral intentions'. Research of Dunn and Reddix (1991) shows that 'for the expository passage, which has been selected to favor analytic, sequential, and organizational processing, Analytic participants recalled significantly more than Wholistics, while Analytics recalling a smaller proportion of the metaphoric material.' In here Analytics are similar to Verbalizers and Wholistics are similar

to Visualizers. They are both about information processing style. People with different cognitive styles consequently recalls differently. In the case of display product information on a website, cognitive styles can be revealed by clicking behavior of a customer (Hauser et al. 2009). Based on which, firms can optimize its information presentation format.

As for the extension of the study, some interaction effects are examined. For example to see whether cognitive style of a respondent affect size effect and order effect. How would involvement level intervene the effect of size and order.

The thesis is organized as follows. First, theoretical background is presented to support the basic theory, and hypotheses are proposed followed with a general overview of methodology. Third, clean data and preparation for analysis. Fourth, the test results are presented and interpreted. And last a conclusion and discussion are presented with some limitations.

Theoretical Backgrounds

A word cloud (or named as tag cloud) is a concise way to summarize the main ideas of a content or text with the most frequently used words. Larger the word is more important and more frequently mentioned the word is. It is a kind of 'weighted list'. There are 3 main types of word cloud; the first type counts the frequency of each item, the second type is also about frequency, however it is the aggregated frequencies over all the text and items that are inputted. The third and last one is about categories, which size illustrates the number of categories. A typical word cloud is in a shape of rectangular with different size/ fonts of words. See Figure 1 for a visual example. The word cloud in Figure 1 indicates the population of each country. Countries that have the largest population are (China,

India and etc.) demonstrated by the largest words. Not only the size has a difference but also colors have different meanings. China and India are displayed with red, the most dominant color in the word cloud.

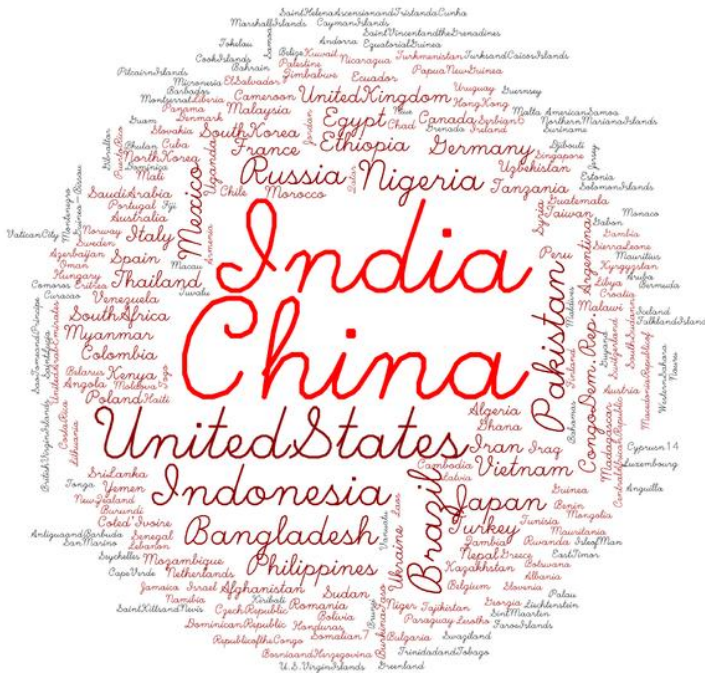Figure 1: typical word clouds -- from Wikipedia[1]

Nowadays word clouds are increasingly used to draw the main idea of some written material, speech or even the board committee documents. It has been used in politics, business and education, few has been employed for product information (Atenstaedt, 2012). Figure 2 on the next page is one of the word clouds used in the survey for this study.

Figure 2: Word Cloud used for presenting hotel information

With word clouds firms can manipulate the size of each attribute a product/ service has. The most outstanding attribute that can attract customers should get more attention than others. Such as in Figure 2, the term Champs-Elysees is the biggest, which we can then infer the hotel is proud of its location and want people to see it at the first glance. It is presented in a picture format, with only key words exist. The word cloud helps people to grasp the idea of the content rather quickly, which the content is simple and clear. Word cloud is not new anymore, quite a lot researches can be found. One of them is the research of Scott Bateman, Carl Gutwin, and Miguel Nacenta(2008)'s, they found out that the size of font, weight of font are stronger in effects than number of words. Word clouds help people to understand the content quickly, people usually scan rather than read them (Rivadeneria et al. 2007).

With this study, 'list of statements' would be compared with 'word clouds' in the product information dimension.

Talking about 'list of statements', it is a widely used product information presentation format. It is a clarified, well-explained way of introducing a product. Automobile makers, real estate manager, cellphone sellers and even detergent

manufactures are using this product information format. Please see the information presentation format below, which is used for the survey.

The figure below is the responding list of statements used for hotel information. Compare with the word cloud in figure 2, several different points can be found.

- **5-star hotel located just steps from the Champs-Elysées, metro stations around**
- **With private terraces that command all of Paris**
- **Lovingly restored 18th-century tapestries**
- **A defining spirit of elegance and charm**
- **The Health Club offers a full range of state-of-the-art exercise and cardiovascular equipment, fitness instructors are available**
- **Offering a comprehensive menu of skin and body treatments, as well as saunas, whirlpools and a pool.**
- **With 24 hours' notice, able to arrange reliable babysitting services.**
- **24-hour business services**
- **Multiple room types including family rooms and suites**
- **Exquisite 2 Michelin-star dining with beautiful views of the Hotel's courtyard**
- **Free Wifi and Satellite TV**
- **Free parking and shuttle bus**

Figure 3: list of statements used for presenting hotel information

Information are more in details for list of statements, they are no longer in key words but in sentences. It has an order for the statements compared with word cloud.

The research of Ward and Tan(2010) investigated the list length effects and order effect -- short memories for list of words. The research was aimed to promote greater theoretical integration between two highly important and

widely used test of immediate memory (immediate serial recall and immediate free recall). The results indicate a decreasing sign of the proportion of words that recalled correctly with an increasing length of the list. On the other hand, participants recalled the list started with the first word for short list generally, however for longer lists, this tendency decreased. 'Participants tend to initiate recall with the very first list item in all immediate memory tasks with short list, even when they are not strictly required to do so. The two tests are more similar than has been previously assumed.' It then is reasonable to assume that when the list gets longer the tendency to recall the front statements decrease.

On the other hand what would happen to the biggest word in a word cloud when the size of word cloud increases? As no related literature has been found for this, it will be tested here as a term corresponds to hypothesis 1 c).

Thus hypothesis 1: a) statements listed in the front are more correctly recalled than the ones listed after. b) bigger size words in a word cloud are given more attention thus better recalled. c) when the list gets longer the probability to recall the statements in the front decreases, d) whilst the biggest words stays dominant even when the number of words increase.

During the past decades, researchers and practitioners have been working on cognitive styles to help improving management ways, thus to generate higher values. People have various cognitive styles when processing information. Cognitive style or "thinking style" is a way to describe an individual's preferred way of thinking; it is the way to perceive and remember information (Messcik. S 1976). Cognitive styles can be mainly divided into four categories. Conceived as leader vs follower, visual vs verbal, impulsive vs deliberative, reader vs listener (Hauser at el. 2009). Word cloud is in picture mode while list of statements is in

verbal mode. It is assumed that among the four cognitive style segments, visual and verbal has the most direct relation to product information presentation format. And for simplicity, in this study only one of the cognitive style segments, visual vs verbal, is selected and discussed. A verbalizer learns and processes information better with verbal materials, whereas a visualizer learns and processes information with visual materials (Laura J, Massa, Richard E, Mayer, 2006). A verbalizer enjoys word games, prefer to read articles than watch pictures or videos whilst a visualizer is more image oriented, visual games oriented.

It was further developed and applied by Mendelson and Thorson(2004) in a research of 'how verbalizer and visualizer process newspaper information.' The study shows people with high verbalizer scores will tend to be more interested in stories than those with low verbalizer scores. A person's visualizing style did not help in recall a story content, however verbalizing style did, no matter there is the presence of a photo or not. Verbalizers recall better than visualizers with the newspaper content.

Former study conducted by Jiang et al. (2007) indicates the effect of image incompatibility on information processing. Visualizer value the hotel less favorably when the image is incompatible with the verbal description than is compatible, however verbalizers are not affected significantly. Also the research of Robert et al.(2008) shows pictures increased participants' evaluations of vacations that were described in a narrative way, while decreased favorableness of unordered list. But none of the studies has researched into the relationship among cognitive style, level of involvement when purchasing and the information set of word clouds and list of attributes. In a word visualizers care about the picture presented and the picture affects the recall rate. Knowing the fact that

word cloud is in picture mode while list of statements is enriched by its content.

Thus hypothesis 2: Visualizers and verbalizers are different in ability of remembering word clouds and list of statements (as product information), which in specific a) people get higher visualizer score than verbalizer score recall word clouds better b) people get higher verbalizer score than visualizer score recall list of statements better.

When making a decision of advertising strategy, the degree of involvement now is one of the important facets (Ray 1982, Tothschild 1979, Vaughn 1980). In theory, involvement level is seen on a base of individual. It is common to have a number of different consequences on consumer behavior. Depending on the individual's involvement level, decision process and choices can differ greatly. Processing communication is also a crucial element for consumers; behavior of choosing product and the level affected by product information provided should change depend on the involvement level. Not only the level of involvement matters, the types of involvement also play an important role (Laurent and Kapferer, 1985). People buy products not just to satisfy their basic needs but for what they mean. There should be congruence between the lifestyle and product meaning (Levy 1963). It is also indicated by Laurent and Kapferer (1985) that when risk of mispurchase is high consumers have higher probability to be highly involved. Durable goods are under the same circumstance. There are 5 distinct facets (it was 4 in the article published 1985 and then Laurent and Kapferer found that interest is also an important facet in another article published in 1986) of involvement profiles listed as follows:

1. *The perceived importance of mispurchase*
2. *The subjective probability of mispurchase*

3. *The hedonic value of the product class*

4. *The perceived sign value of the product class*

5. *Interest as enduring relationship with the product class*

It is not sufficient to examine one facet, the combination of the full profile generate insights. The multiple product lines meet the 5 dominant facets listed above (Laurent & Kapferer, 1985).

When perceived importance of mispurchase is high, that is when the price is higher; people will usually think more as they make decisions. They will compare among products and willing to know more of the product. In the case of durable goods, one has to use for a long time, has to bear it if it is not the right 'thing'. They face the same situation when the subjective probability of mispurchase is high. When hedonic value is high, in this case for example for those people who enjoys taking high quality photos are more concerned about the parameters in detail, therefore these kinds of customers probably prefers product information in list of statements. They want to know the exact figures of the camera. Whereas word clouds help people to learn something quickly, it is an interesting, brief and clear way of introducing a product. It can only provide the most outstanding attributes in a rhetoric way.

Thus hypothesis 3: preferences of product information would change when the involvement level is different. a) When there is high involvement in purchasing things, people prefer product information provided with list of statements over word clouds. b) When there is low involvement in purchasing things, people prefer product information provided with word clouds over list of statements.

To sum up the hypotheses above, we know that list of statements has order effect

that statements in the front are more easily recalled and bigger size words are given more attention in a word cloud. Visualizers prefer word clouds as product information while verbalizers like and remember the content of list of statements better under the circumstance that with high level of involvement. Inspired by the conclusion of Mendelson and Thorson (2004)'s research that visualizers recall better if a picture is present while the picture does not affect verbalizers. Furthermore, research of Jiang et al. (2007) shows that when the image is incompatible with contents for hotel information, visualizers value less favorably for the hotel. We can conclude that visualizers and verbalizers are not indifferent in sensitiveness towards various information formats. And if all the hypotheses above are true, then refer to the hypotheses above we can assume:

Hypothesis 4: a) visualizers are more sensitive to size effect of word clouds than order effect of list of statements. b) Verbalizers are more sensitive to order effect of the list of statements than size effect of the word clouds.

The hypothesized relationship among product information, involvement level, cognitive style and purchase information are as Figure 4 below.
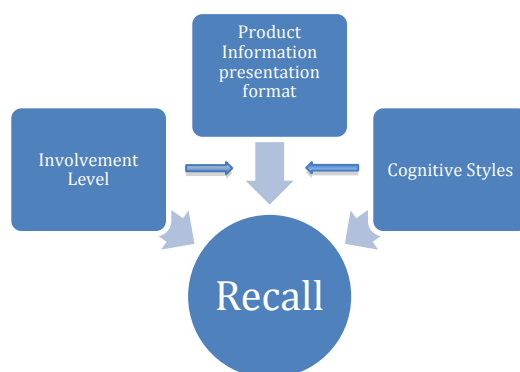

Figure 4

Questionnaire Design

To investigate and verify the relationships, a questionnaire consists of the following elements will be conducted. Figure 5 shows the whole process.

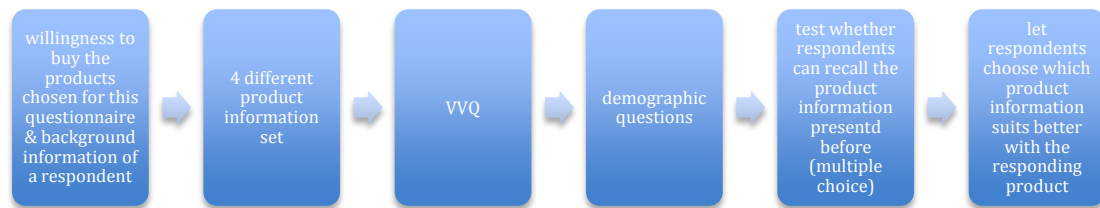| willingness to buy the products chosen for this questionnaire & background information of a respondent | → | 4 different product information set | → | VVQ | → | demographic questions | → | test whether respondents can recall the product information presentd before (multiple choice) | → | let respondents choose which product information suits better with the responding product |

Figure 5

The products chosen for this study are camera (SLR camera and Compact camera. SLR and Compact for short below), hotel and detergent. To show the different level of involvement, the products are tested in pairs. As the quality of photos taken by smart phone is getting better, compact camera is losing its market share; it gives a good example of the lower bound of involvement level in the perceived value dimension. Hotel is perceived very individual dependent kind of product, the level of involvement can vary quite a lot among people, while detergent is one of the necessity. The first section of the questionnaire would be the involvement level scale (Laurent and Kapferer, 1985; Bearden and Netemeyer Handbook of Marketing Scales, 1999) for each product; it is used to measure how each respondent value the product chosen. Thus to see whether those 'really care' people and 'do not care' people differs in ability to remember the attributes of the products.

In order to compare effects between groups, 8 product information sets are displayed in separate questionnaires at the second stage. For each respondent they only see one out of eight sets, which will pop up randomly when he/she clicks the link.

1. *Compact information in list of statement & SLR information in word clouds.*
2. *Compact information in word clouds & SLR information in list of statements.*
3. *Compact information in list of statements with different order of the statements compare to the first information set & SLR information in word clouds with different layout compare to the first information set.*
4. *Compact information in word clouds with different layout compare to the first information set & SLR information in list of statements with different order of the statements compare to the first information set.*

With group 3 & 4, it is able to test order effect and size effect. (See Table 1 for simplicity.)

Product Type	SLR CAMERA	COMPACT CAMERA
GROUP 1	Word Clouds	List of Statements
GROUP 2	List of Statements	Word Clouds
GROUP 3	WL(change size) group 1	List of S. (change order) -- compared with
GROUP 4	List of S. (change order) group 2	WL(change size) -- compared with

Table 1

5. *Detergent information in list of statement & HOTEL information in word clouds.*
6. *Detergent information in word clouds & HOTEL information in list of*

statements.

7. *Detergent information in list of statements with different order of the statements compare to the first information set & HOTEL information in word clouds with different layout compare to the first information set.*

8. *Detergent information in word clouds with different layout compare to the first information set & HOTEL information in list of statements with different order of the statements compare to the first information set.*

With group 7 & 8, it is able to test order effect and size effect. (See Table 2 for simplicity.)

Product Type	HOTEL	DETERGENT
GROUP 5	Word Clouds	List of Statements
GROUP 6	List of Statements	Word Clouds
GROUP 7	WL(change size)	List of S. (change order) -- compared with group 5
GROUP 8	List of S. (change order)	WL(change size) -- compared with group 6

Table 2

Third, to measure whether a person is a visualizer or a verbalizer, VVQ (visualizer-verbalizer questionnaire) is used. VVQ is a questionnaire consists of 15 information processing related questions, which was first proposed by Richardson(1977) based on the study of Pavio(1971) whom developed a 86-item questionnaire about thinking. According to Childers et al.(1985), it is indicated that the VVQ measure is of poor internal consistency and low reliability. Therefore Childers conducted additional research of improving the scale. The 15-item scale was changed into a 22-item scale, and the response alternatives increased to 5(Kirbey et al. 1988), which the original method has only 'yes' and

'no' response alternatives. The 22-item scale increased internal consistency and reliability. Hence the developed scale is used for this study. Respondents should answer VVQ thus to measure their cognitive style; followed with some personal questions, which can be used to distinguish the possible moderating effect. There will be list of questions asked to test whether respondents remember what is shown in the product information previously. Together with the 'true' statements, some 'false' statements are listed to 'confuse' them. The statements are shuffled that they are not displayed in the same order as people have seen in the product information. In addition, if one gets right for the 'true' statement, he gets one point; if he thought the 'false' statement is right, then he gets minus one point. There are around 10-16 questions in total for each kind of product. The correct rate will be counted and used for analysis. Finally, respondents will choose the preferred information format for SLR camera, compact camera, hotel and detergent.

There are 8 versions of questionnaire in total due to the long length. Respondents might get really tired and not willing to make choices, thus one respondent is only asked to review one group of product and product information.

For full questionnaire please go to appendix 1.

General Overview of Methodology

Before analyzing the data, it is helpful to have an overview of the methods used here. Based on the data collected and hypotheses, linear regression, logistic regression and one-way ANOVA are used for analysis.

For hypothesis 1, size effect of word clouds and order effect of list of statements are tested. Figure 6 & 7 below are examples of product information for SLR camera in word cloud format. 2 figures contain the exactly same information except there is size difference for some of the words. To create a word cloud, you need to input a bunch of text first, which 'WORDLE' (a software used for creating word clouds) will count for the frequency a word is mentioned in the text, the biggest words indicate that it is mentioned the most. For convenience, the word size is scaled from 1-5, which 1 stands for the smallest words in the figure and 5 stands for the biggest words. If a word were mentioned once in the text it would be too small for a respondent to recognize. Therefore each word is mentioned at least twice. Thus for simplicity a word size 1 means the word/phrase is mentioned twice in the text inputted and 5 means the word/phrase is mentioned 6 times.

Figure 6: Word Clouds for SLR camera 1   Figure 7: Word Clouds for SLR camera 2
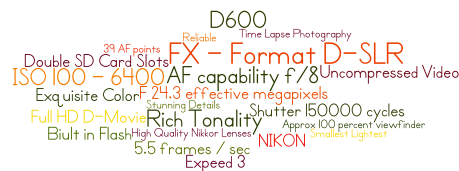
Pictures shown above have multiple colors, which may affect the probability of recalling a certain word. In the real questionnaire all black and white word clouds are used to avoid such color effect.

Respondents are asked questions about the information they have seen, to test whether they can recall the content. Linear Regression is used and the function is as below:

$$Y_i = \beta_0 + \beta_1 size2_i + \beta_2 size3_i + \beta_3 size4_i + \beta_4 size5_i + \beta_5 vis.ver_i + \beta_6 inv.lev_i +$$

$$\varepsilon_i \qquad (1)$$

* Y_i = mean centered (for each respondent) recall rate for each word,   size = 1/2/3/4/5 which size here is

dummy variable size2=1 means the word size is 2, size3=1 word size is 3, size4=1 word size is 4, size5=1

word size is 5, when all of them is equivalent to 0 word size is 1.   vis.ver = score that a respondent get by

answering VVQ,   inv.lev = involvement level

Based on the mean centered variables, individual specific level effects cannot be estimated. So another approach with average recall rate as dependent variable is used to estimate the individual level effects.

$$Y_i = \beta_0 + \beta_1 product_i + \beta_2 vis.ver_i + \beta_3 inv.lev_i + \beta_6 inv.lev_i * product_i + \varepsilon_i \quad (2)$$

* Y_i = average recall rate,   product = product category,   inv.lev = involvement level,   inv.lev*product =

interaction effect of involvement level and product category

Note that this is also applied under the occasion of list of statements.

Involvement level is hard to measure directly hence proxy is needed. Luckily, the handbook of marketing scales introduced a lot of scales, among which the one invented by Laurent and Kapferer suits this study the best. They view involvement in 5 dimensions. The CIP (Consumer Involvement level) is consisted of 16 Likert-type statements from totally disagree to totally agree, which are all scored on a 5-point basis. Validity was tested, internal consistency reliability for perceived importance of the product, symbolic or sign value, hedonic value, perceived importance of the negative consequences of a poor choice, and probability of making a poor choice were 0.80, 0.90, 0.88, 0.82 and 0.72 respectively (Bearden and Netemeyer, Handbook of Marketing Scales, 1999).

Later they found out that the perceived risk of the negative consequences of a poor choice is not a facet that dominates. Therefore, it was combined with the facet of product risk, and the estimates get to 0.82. Since the 4 facets only explain 66% of the variance, 'interest' is added as the fifth facet in CIP.

The items represent different facets. For items 1 to 3, perceived product 'importance/ risk is measured'. 'Probability of a mispurchase' is represented by item 4 to item 7. Items 8 to 10 are about the facet of 'perceived symbolic/sign', whereas items 11 to 13, 14 to 16 represent 'hedonic pleasure' and 'interest' respectively.

With logistic regression size effect of a word cloud is measured, it is applied to each word cloud picture. To verify the relationship of size and possibility to recall successfully, ANOVA is applied to test whether the means of several groups are equal.

In order to test the sensitiveness of size change towards visualizer score, an interaction variable of size and vis.ver score might be helpful. Indicating when size increase by 1 how will recall rate change when vvq score is increased by 1(due to there are two facets of scores, visual score and verbal score, coded they should each interact with size.). Just need to generalize Eq 1 a little bit, see Eq 3 below:

$$Y_i = \beta_0 + \beta_1 size2_i + \beta_2 size3_i + \beta_3 size4_i + \beta_4 size5_i + \beta_5 visu.verb_i +$$
$$\beta_6 inv.lev_i + \beta_7 size2 * vis.ver_i + \beta_8 size3 * vis.ver_i + \beta_9 size4 * vis.ver_i +$$
$$\beta_{10} size5 * vis.ver_i + \varepsilon_i \tag{3}$$

* Y_i = mean centered (of each respondent) recall rate for each word,　size = 1/2/3/4/5 which size here is

dummy variable size2=1 means the word size is 2, size3=1 word size is 3, size4=1 word size is 4, size5=1

word size is 5, when all of them is equivalent to 0 word size is 1, vis.ver = score that a respondent get by answering VVQ, inv.lev = involvement level, size*vis.ver = interaction effect of cognitive style and size, it is either visual score or verbal score.

So far we have talked about size effect, order effect is measured as follows.

Suppose there are 20 statements in a product information list. The list can be divided into 3 sections; the first 3 statements belong to section 1, the last 3 statements belong to section 3 while the statements in the middle belong to section 2. We test the average recall rate of each section. In fact for the products chosen for this study, the length of list of statements differs among each other. Some of them have 10 statements whereas the others have 14 and 15 statements.

Now that the list is in sections, we can apply the same model we used for measuring size effect. However instead of using 'whether a respondent can recall a certain statement', 'the average recall rate for each section' is used. As 'section' is not a continuous variable, dummy variables can be used as 'proxy' variables, in another word, numeric stand-ins in the model. The average successful recall rate is counted for each section.

$$Y_i = \beta_0 + \beta_1 sec1_i + \beta_2 sec2_i + +\beta_3 vis.ver_i + \beta_4 inv.lev_i + \varepsilon_i \qquad (4)$$

* Y_i = average recall rate of each section, sec = section which section 3 is served as section constant, vis.ver = score that a respondent get by answering VVQ, inv.lev = involvement level

In hypothesis 1, it is also mentioned that when the list of statements gets longer the recall rate for the first sections will decrease. To test this, ANOVA is needed. Whether the means of the successful recalling rate for the 1st, 2nd section are equal for different length of list of statements.

To test the sensitiveness of people who has different cognitive styles towards order effect, run the test separately with subgroups of visual score and verbal score is crucial. Elaborate the model by including interaction variable of 'section' and 'vis.ver'.

$$Y_i = \beta_0 + \beta_1 sec1_i + \beta_2 sec2_i + \beta_3 vis.ver_i + \beta_4 inv.lev_i + \beta_5 sec1 * vis.ver_i +$$
$$\beta_6 sec2 * vis.ver_i + \varepsilon_i$$

(5)

Till now hypothesis 1 and hypothesis 4 can be verified according to the models above.

As for hypothesis 2, one-way ANOVA test is used to measure whether the means of right answers vary among different groups, for example visualizer group and verbalizer group. The respondents are required to answer several (the number depends on how much information was shown before) questions for each product information set, thus to test how well do they remember the product information. Correct rate serves as dependent variable and cognitive style as independent variable.

In order to test how involvement level will influence a respondent making choice of product information, choice based conjoint analysis is applied. Which utility of a certain product and product information combination is tested. The dependent variable is whether respondents choose word cloud or list of statements for certain kind of product. The formula is written as follows:

$$Y_i = \beta_0 + \beta_1 vis.ver_i + \beta_2 inv.lev\_product_i + \varepsilon_i \qquad (6)$$

*Y_i = probability of choosing a certain kind of information format, vis.ver = the visual score and verbal score of a respondent, inv.lev_product= involvement level of a certain product

With this model it would be clear that how would it be affected if the level of involvement increases or decreases by one.

All the hypotheses can be tested with the questionnaire.

Data Cleaning

The analysis starts from cleaning data. There are 209 valid questionnaires in total with 115 female respondents and 89 male respondents and 5 missing values for gender.

Delete invalid responses and dealing with missing items

The data was collected both online and offline. There were 310 responses at first in total including the ones that collected in the university (off-line). A lot of invalid answer sheets exist, that is probably due to that part of the respondents are not familiar with online survey or the survey was too long to get their patience.

Responses that under 80% completions are deleted, 209 responses remained. However there is still some missing items. For the remained missing items, it should be tested whether it is possible to use expectation maximization or not, which it requires the data is missing completely at random. After applying the missing value analysis EM, the null hypothesis of random missing is rejected.

Note that the independent variables don't have normal distribution, thus assumptions violated. For simplicity, for the missing data of scales (involvement level and VVQ) mean series is applied. For the variables that are categorical, listwise deletion is used when running tests.

The limitation is that the outcome might be biased because that the data is not MCAR. List-wise deletion often produces unbiased regression slope estimates as long as missingness is not a function of outcome variable.

There are 8 groups with different questionnaires; all of respondents are required to answer questions about the involvement level (for the products tested), a VVQ for measuring cognitive style. As they have almost the same data format, it is possible to combine all the data into one sheet for the convenience of analysis. However, the number of questions asked for recalling words in word clouds and statements in list of statements are different. Some have more questions than others, some don't. 2 groups within 8 groups are in a pair, which shares the same questions for the recall session. They are groups 3&8, 2&5, 6&7 and 1&4.

Compute Variables

When creating variables of recalling word cloud, the groups that have most recalling questions determine the number of variables. For example, groups 3&8 have 14 questions, and then 14 variables are created. For the groups that only have 12 questions just keep the last 2 columns blank. This method is also applied for list of statements.

Recode scales

There are 2 scales used in this study as mentioned before. Some items in the scales are reversed, which should be reverse scaled. Select the items that need to

be recoded and then recode.

The involvement level contains 5 facets; mean score of each facet is computed whereas VVQ is split into 2 parts, sum up both scores from the verbal items and visual items.

For the reason that in different groups the combination of product information and product information format change, while the order of involvement level scale doesn't change each time, the variables of involvement level generated by Qualtrics systematically is not usable. So that variables (five facets) of 'involvement level for word cloud' should be created.

Please refer to the table below:

Groups	Involvement level			
1	1 SLR	LOS	2 COMPACT	WCL
2	1 SLR	WCL	2 COMPACT	LOS
3	1 HOTEL	WCL	2 DETERGENT	LOS
4	1 SLR	LOS	2 COMPACT	WCL
5	1 SLR	WCL	2 COMPACT	LOS
6	1 HOTEL	LOS	2 DETERGENT	WCL
7	1 HOTEL	LOS	2 DETERGENT	WCL
8	1 HOTEL	WCL	2 DETERGENT	LOS

* LOS stands for list of statements, WCL stands for word cloud

Table 3

So when the dependent variable is the recall rate of a certain word in a word cloud, the involvement level scale used then will be:

Groups	Responding Involvement level scale	
	WCL	LOS
1	2 (the 2nd scale in questionnaire version 1)	1 (the 1st scale in questionnaire version 1)
2	1	2
3	1	2

4	2	1
5	1	2
6	2	1
7	2	1
8	1	2

Table 4

Make variables continuous

When regression is used it requires that both dependent variable and independent variable are continuous. Change nominal variables into continuous variables by adding dummy variables. For variable edu, 4 dummies were created 'others' as base level. For variable 'WorkStatus' 3 dummy variables were created 'others' is served as the base level. Gender itself is a dummy variable, '1' stands for male while '0' stands for female. Word size in a word cloud is a very important variable for testing size effect, which is not included in the original data sheet. For each word needs to be recalled, dummy variables of size are added.

Variable 'income' was converted into a continuous variable by change the answers into the median of the interval scale. Thus 1=750 euro，2=1250 euro, 3=1750 euro, 4=2250 euro and 5= 2750 euro.

Each respondent answered more than 10 questions about whether they can recall a certain word from a word cloud or a list of statement. When 'whether a respondent succeed in recall a certain word/statement' serves as the dependent variable, for each respondent there exists more than 10 dependent variables while values of independent variables keep the same. Expand the dataset by 209*10 approximately [although the exact number of the new data set is 1930, 1930=(group1+group4)*10+(group2+group5)*9+(group3+group8)*10+(group6

+group7)*8], that is using multiple observations per person. Under this situation, the observations from the same respondent are dependent. To lower the dependence across the observations, the mean recall rate of each respondent is computed, and minus that value by the dummy variable on whether a word is recalled or not. The average recall after mean centering for WCL is around -0.0066. Same method is applied to the LOS analysis part. After make use of each response repeatedly, the number of observation for testing list of statement get to 2197 [2197 = (group1+group4)*10 + (group2+group5)*13 + (group3+group8)*7 + (group6+group7)*12]. The average recall after mean centering for LOS is around -0.0044, approaching 0.

Modeling and Testing

Assumption test

The first model used for testing size effect is assumed to be linear regression. With recall rate as dependent variable and size, involvement level, cognitive style, demographic as independent variable.

Pearson correlation is first tested; variables of sizes are significantly correlated with each other, the same for the 5 facets of involvement level. It seems fine that the effects are not high. Further analysis on VIF need to be done.

The residual seems to be a normal distribution and the PP plot shows there is some deviation to the least square line, but not too much it is not actually informative. For the scatter plot of regression residual to the standardized predicted value, it seems that heteroskedasticity exists although the scatters are

almost evenly distributed above and below 0. For output figures please go to appendix 2.

The correlation scatter plots (for saving space, these are not displayed here) indicate that only a few explanatory variables like verbalscore and interest dimension of involvement level has a linear relationship with the dependent variable. Most of the other explanatory variables did not show any patterns. More assumptions are tested for the following analyses. Since there are too many of them they are not displayed one by one. To sum up we know that linear effects to some extent exist.

Modeling and Interpretaion

Regression models with Recall_Wl_mean_centered as dependent variable

variable	Model 1			Model 2			Model 3		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	-0.041	0.130		-0.061	0.065		-0.055***	0.015	
Size2_U	0.062***	0.024	1.210	0.062***	0.024	1.210	0.062***	0.024	1.209
Size3_U	0.074***	0.028	1.179	0.073***	0.027	1.179	0.073***	0.027	1.176
Size4_U	0.228***	0.035	1.113	0.228***	0.035	1.113	0.228***	0.035	1.113
Size5_U	0.074**	0.040	1.088	0.073**	0.040	1.086	0.073*	0.040	1.085
Per_imp_riskW	0.001	0.020	1.314	0.001	0.020	1.310			
Prob_mispWL	-0.001	0.014	1.282	0.000	0.013	1.202			
Per_sym_signV	0.000	0.013	1.543	0.000	0.013	1.495			
HedonicWL	0.001	0.012	1.704	0.000	0.011	1.553			
InterestWL	0.000	0.016	1.481	0.001	0.016	1.450			
VerbalScaleWL	0.000	0.002	1.104						
VisualScaleWL	0.000	0.002	1.113						
No Observation	1930			1930			1930		
R Square	0.023			0.022			0.023		

*** p-value < 0.01
** p-value < 0.05
* p-value < 0.1

Table 5

Model 1 and 2 contains variables like involvement level and cognitive styles. Both size effect in model 1 and 2 are significant, even magnitude are approximately the same, except for constant. That is probably the constant also captures other effect besides for size1 word. According to the outcome of model 2 in table 5 size effect are all significant under the significance level of 5%. A size 2 word is 6.2% more likely to be recalled than a size 1 word. A size 3 word is 7.3% more likely to

be recalled than a size 1 word. A size 4 word is most likely to be recalled among all size words that it is 15.5% higher possibility recalled than a size 3 word and even 15.5% higher than size 5 word.

Because the measure is mean centered per respondent to control for systematic differences between respondents, it ruins some effects on the individual level so that the involvement level, education level and all the information that is used multiple times are not significant. Separate models should be run to seize the effects on individual level.

Model 3 is the adjusted model used to test the size effect only. After the other variables are removed, the magnitude of the effect changed a little bit, while the constant turned out to be highly significant. This is because in model 1 and 2, there is other variables such as involvement level and cognitive style, which they all affect the constant. If the word size is 1, it has a negative effect of recalling words, approximately 5.48% lower. If the word size is 2, there is 11.72% higher probability to recall than when the word size is 1. Size 4 has the biggest positive magnitude with 28.24% higher than size 1. But its size 3and size 5 has the same effect size is really abnormal. If the significance level was selected at 5%, then effect of size 5 word is insignificant, which means it has the same effect with size 1. It might be that the word in size 4 are better known by people, shorter words and not difficult to keep in mind.

For more detailed information with control variables, please go to appendix 2. With this model, it is proved that size effect do exist however not the biggest size get the most attention. Thus hypothesis 1.b) a bigger size word in a word cloud is given more attention thus better recalled is only partially supported.

As in both model 1 and model 2, involvement level and cognitive style don't have a significant effect towards recall of each word. Another regression takes the recall score (an average score of all the words that a respondent recalled with the control of 'guessing' words) of each respondent as the dependent variable and excludes size as the independent variable.

*Some rules of the score computation are applied, stated as follows:

1. A respondent gets '1' point for answering 'yes' for an existing word, gets '-1' point by saying 'yes' for a word that was actually not displayed in the word cloud. A respondent gets '0' point for other situations.

2. As the quantity of questions asked are different for each group, so computation is needed for the scores to stand in the same baseline. It's just simply to compute the proportion. The relationship is as in the table below.

Group	Qty of questions asked	Qty of the words exist in the WCL	Qty of the words not exist in the WCL	Convert them into the same scale (only for existing words)
1 & 4	14	10	4	ScoreEX/10
2 & 5	13	9	4	scoreEX/9
3 & 8	14	10	4	ScoreEX/10
6 & 7	12	8	4	ScoreEX/8

Table 6

3. The final score is computed as follows:

$$Final\ Score = scoreEX/\ (nr\ existing) - ScoreNOEX/4.$$

*ScoreEX = the score a respondent get for answering questions that the words exist in the word cloud

ScoreNOEX = the score a respondent get for answering questions that the words do not exist in the word cloud.

*Same method is applied to the LOS situation.

For this series of model with word clouds mean correct rate as dependent variable, 209 responses are fully used for the testing the effect of involvement level and cognitive style. The product category is also included as dummy variables. Interaction variables of each product and 5 dimensions of involvement level are created indicating the partial effect of a certain involvement dimension if it is with a certain product. However with only 209 responses, the full model (model 4 in table 7) without the control of demographic variables contains 28 variables. Model 5, 6, 7, 8 and 9 are the restricted models based on model 4.

Regression models with WL_mean correct rate as dependent variable

	Model 4			Model 5			Model 6			Model 7		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	-0.246	0.349		-0.371	0.258		-0.345	0.271		0.013	0.037	
imp_riskWL	-0.020	0.085	6.251	0.046	0.040	1.335	0.045	0.042	1.313			
misp_WL	0.090	0.064	6.974	0.026	0.028	1.364	0.016	0.029	1.281			
symbol_sign_WL	-0.085	0.052	6.518	-0.029	0.026	1.563	-0.036	0.027	1.534			
hedonicWL	0.033	0.050	7.535	-0.011	0.026	2.084	-0.057**	0.025	1.687			
interestWL	-0.025	0.064	6.107	-0.012	0.032	1.498	-0.001	0.034	1.474			
verbWL	0.007*	0.004	1.229	0.006	0.005	1.855	0.011**	0.004	1.101			
visualWL	0.001	0.003	1.239	0.003	0.005	2.164	0.005	0.004	1.109			
SLR	0.598	0.448	102.644	0.178***	0.056	1.597				0.210***	0.053	1.452
COMPACT	-0.037	0.369	72.220	-0.024	0.055	1.565				-0.004	0.053	1.466
HOTEL	-0.110	0.405	85.088	0.262***	0.060	1.859				0.298***	0.053	1.457
imp_slr	-0.094	0.128	96.537									
misp_slr	-0.162*	0.088	40.885									
symbol_slr	0.079	0.073	24.167									
hedonic_slr	0.014	0.075	34.380									
interest_slr	0.037	0.097	42.608									
interest_compact	0.081	0.092	40.728									
hedonic_compact	-0.083	0.072	37.542									
symbol_compact	0.016	0.073	26.023									
misp_compact	-0.062	0.080	36.657									
imp_compact	0.057	0.111	79.220									
imp_hotel	0.209*	0.115	71.286									
misp_hotel	-0.072	0.083	28.608									
symbol_hotel	0.082	0.075	17.988									
hedonic_hotel	-0.108	0.070	15.070									
interest_hotel	-0.016	0.102	35.332									
cognitive_style				-0.024	0.062	2.672						
No Observations	209			209			209			209		
R Square	0.282			0.220			0.092			0.191		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 7

Have a general view of the whole table, there are only a few variables that are actually significant. Check out the VIF value of model 4, we find there is high correalation among the variables. Though under this situation the coefficient estimates may not be accurate, the predictive power or reliability of the model does not reduce as a whole. So for model 4 the variables has a 28.2% explaination power, which is high. In addition, have more than 20 variables is simply too much for a 209 sample. Such a high degrees of freedom lowers the threshold for a significant result.

Model 5 and 7 indicates that the mean recall rate for word cloud of a respondent has significant relations to the product category itself. The coeffcient estimates varies a little bit between the 2 models. Both SLR camera and Hotel have significant positive relationship with the mean recall rate. The corresponding magnitude are 0.178 and 0.262 in model 5, which means if the recall process is about the SLR camera, there is 17.8% higher probability to recall a word than the product is detergent (detergent is served as the base line here, the effect is captured in the constant, the constant itself is not significant). If the product is a Hotel then 26.2% higher probability of recalling a word than a word from detergent. The viariable cognitive style illustrates whether a person has a higher visual score or a verbal score.

Model 6 is used to capture only the main effects of involvment level and cognitive style, the model itself has 9.2% explaination power. In which we can conclude hedonic value has a negative effect with the mean recall rate of WCL, when hedonic value is 1 point higher, the average recall rate is 5.7% lower. When people persue high hedonic value, they might be only interested in some specific attributes and think others irrelavant. For example, a hotel on a island in Greece, 'sea view' is the thing a customer enjoys the most. He might do not care whether

they provide servises of SPA and such. And automatically ignores such information.

If the verbal score is 1 point higher then the average recall rate for WCL can be 1.1% higher. This effect is probably due to the fact that although a word cloud is displayed in a picture format, the content itself is still about words and phrases. Verbalizers are better in ability to remember words.

Model 7 is about the main effects of product categories. Its explanation power exceeds 19%, which means for the explanatory variables tested, the product category explains the most variances. The effect magnitude is 0.21 and 0.298 respectively for SLR and Hotel. The effect size if a bit larger than that the ones in model 5. Joint effects with other independent variables in model 5 might mitigate the effect of product category.

To sum up, involvement level in general does not have effect on word clouds recall within this study. The models presented above are not tested with demographic variables, as most of them are insignificant, only age has positive effect with the recall rate, infers when people gets older they recall more. Please go to Appendix 2 for outcome table.

Regression models with Recall LOS as dependent variable

	Model 8			Model 9		
variable	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	0.043	0.110		0.028	0.017	
Section_1	-0.029	0.024	1.429	-0.029	0.024	1.429
Section_2	-0.055**	0.022	1.435	-0.056**	0.022	1.429
Per_imp_riskLOS	0.007	0.019	1.282			
Prob_mispLOS	-0.008	0.013	1.260			
Per_sym_signLOS	0.005	0.012	1.554			
HedonicLOS	-0.001	0.011	1.922			
InterestLOS	-0.001	0.017	1.791			
VerbalScaleLOS	0.000	0.002	1.100			
VisualScaleLOS	0.000	0.001	1.029			
No Observations	2197			2197		
R Square	0.003			0.003		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 8

Model 8 and 9 are used to test the order effect of LOS, the explaination power of both models are the same, 0.3%. It is a rather low figure which means the extra independent variables in the full model did not add explaining power than the restricted model. We can somehow infer that the restricted model is better, with lower degrees of freedom and no multicolinearity problems. Also due to the mean center for each response, individual level effects cannot be estimated.

Independent variable section 2 has a significant negative correlation with recall of LOS. Bear in mind that there are 3 sections in total and section 3 is served as the baseline. The insignificant value of constant and section 1 means the recall rate for section 1 and section 3 are indifferent in this study. And the recall rate in section 2 is generally 5.6% lower than the other 2.

Thus hypothesis 1. a) is partly supported that order effect does exists, however the middle section is paid with lower attention.

Since again we need to test the effect of involvement level on recall of LOS, average recall rate LOS of each response is calculated as the new dependent variable. A comparison among the models are shown below in table 9.

Regression models with LOS mean correct rate as dependent variable

	Model 10			Model 11			Model 12			Model 13			Model 14			Model 15		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	-0.119	0.283		0.085	0.169		-0.103	0.267		0.210	0.150		-0.020	0.214		0.265***	0.044	
imp_riskLOS	0.038	0.074	3.299	0.053	0.072	3.017	0.045	0.046	1.331	0.033	0.047	1.270						
misp_LOS	0.061	0.064	4.779	0.042	0.065	4.670	-0.003	0.032	1.253	-0.008	0.033	1.232						
symbol_sign_LOS	-0.051	0.064	7.260	-0.069	0.065	7.132	-0.017	0.028	1.446	-0.011	0.029	1.418						
hedonicLOS	0.059	0.073	11.770	0.094	0.073	11.305	-0.026	0.029	1.977	-0.037	0.029	1.781						
interestLOS	-0.055	0.076	5.451	-0.042	0.077	5.242	0.032	0.043	1.794	0.026	0.044	1.787						
verbLOS	0.007	0.005	1.160				0.008*	0.005	1.071				0.007	0.005	1.008			
visualLOS	0.000	0.004	1.155				0.000	0.004	1.037				0.000	0.004	1.010			
SLR	0.027	0.106	3.921				-0.060	0.071	1.813							-0.012	0.064	1.452
COMPACT	-0.204***	0.068	1.670				-0.200***	0.065	1.543							-0.181***	0.063	1.466
HOTEL	0.144	0.112	4.441				0.024	0.068	1.689							0.040	0.063	1.457
cognitive_style	-0.050	0.049	1.135										-0.010	0.047	1.013			
imp_slr	-0.041	0.112	53.580	-0.048	0.112	50.775												
mis_slr	0.006	0.098	42.031	-0.015	0.099	41.067												
sym_slr	-0.041	0.090	28.935	-0.001	0.091	28.260												
hedonic_slr	-0.060	0.101	53.175	-0.125	0.100	50.373												
interest_slr	0.129	0.136	67.350	0.136	0.135	62.739												
imp_com	0.070	0.103	40.960	0.082	0.104	40.075												
mis_com	-0.141	0.091	28.484	-0.127	0.093	28.021												
sym_com	0.017	0.089	26.023	0.029	0.090	25.158												
hedonic_com	-0.156	0.093	33.885	-0.148	0.093	32.076												
intersest_com	0.184	0.114	38.227	0.131	0.112	35.026												
imp_hotel	-0.047	0.102	43.853	-0.081	0.101	41.058												
misp_hotel	-0.050	0.090	27.587	-0.005	0.091	26.766												
sym_hotel	0.096	0.085	28.904	0.121	0.086	28.387												
hedonic_hotel	-0.054	0.108	50.418	-0.087	0.110	49.406												
interest_hotel	0.080	0.134	58.022	0.014	0.136	56.250												
No Observation	209			209			209			209			209			209		
R Square	0.144			0.068			0.089			0.013			0.010			0.065		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 9

The full model clearly has more explaination power than the restricted ones, however the situation here is the same as it was for recalling word cloud previously. So to explain the relationship among the significant independent variables and the average recall rate of LOS, the coefficient estimates in the restricted model are used.

In model 12, verbal score has a positive (under the assumption that p-value < 0.1) relationship with average LOS recall rate, it is slightly smaller than the effect for WCL. If the product is compact camera, then the average recall rate is 20% lower than detergent and other products, as they are indifferent in recalling things. One thing that could be the main reason is that the length of list of statements of compact camera is the longest, 13 statements and 17 testing questions. Not to mention the camera parameters are harder to remember.

The main effects of the involvement level are not of great importance to explain the recall rate variances. As demographic variables are not the main effects we want to learn here, they only exists for control. The outcome table includes demographic variables are put in Appendix 2.

Effect of involvment level on product information format choices

	Model 16			Model 17			Model 18			Model 19		
variable	Coeff	Std. Error	Exp(B)	Coeff	Std. Error	Exp(B)	Coeff	Std. Error	Exp(B)	Coeff	Std. Error	Exp(B)
Constant	2.427	2.686	11.319	-1.290	2.627	1.011	2.642	2.463	14.043	-1.685	2.391	1.371
inv_slr	0.031	0.424	1.032									
inv_slr_2	0.288	0.305	1.334									
inv_slr_3	0.063	0.282	1.065									
inv_slr_4	0.205	0.305	1.228									
inv_slr_5	-0.325	0.407	0.723									
verbLOS	-0.015	0.048	0.986	0.006	0.047	0.993	0.004	0.041	1.004	0.015	0.038	0.998
visualLOS	-0.063*	0.036	0.939	-0.007	0.036	0.275	-0.093**	0.042	0.911	-0.002	0.035	0.185
inv_com				0.011	0.462	1.498						
inv_com_2				0.404	0.310	1.175						
inv_com_3				0.161	0.271	1.107						
inv_com_4				0.102	0.278	0.939						
inv_com_5				-0.063	0.366	1.006						
inv_hotel							0.407	0.436	1.503			
inv_hotel_2							-0.019	0.329	0.981			
inv_hotel_3							0.076	0.273	1.079			
inv_hotel_4							0.325	0.304	1.383			
inv_hotel_5							-0.493	0.430	0.611			
inv_detergent										0.316	0.394	1.206
inv_detergent_2										0.187	0.273	0.634
inv_detergent_3										-0.456	0.291	1.034
inv_detergent_4										0.033	0.297	1.406
inv_detergent_5										0.341	0.366	1.015
No Observat	102			102			103			101		
R Square	0.049			0.033			0.077			0.043		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 10

Model 16-19 shown in table 10 are the outcomes of binary logistic regression testing, it depicts how involvment level will affect the choice making over information presentation format. Dependent variable is a binary choice of WCL or LOS (1 stands for WCL and 2 stands for LOS) as information format for a certain kind of product. So in model 16, it measures how involvment level will affect the choice on information format for SLR camera and so forth.

On the grounds that there are 8 versions of questionnaire, questions about choosing preffered product information presentaion format are asked for all the products studied, however each respondent answers 2 involvement level scale, and only the one who answers the involvment level for the corresponding product is valid for this test. So the sample size for each test is around (use listwise deletion, responses with missing values are deleted) half of the whole

sample.

See through the whole table, there are only 2 variables that are significant, which both for visual scores. If a person's visual score is 1 point higher, there are 6.1% (see the Exp value in table 10) less probability of choosing the information format of LOS for SLR camera. Indicating visualizers prefer WCL as information format over LOS for SLR camera. The same works for Hotel, and even more, p-value of visual score for hotel is under 0.05. When the verbal score increases by 1, people have almost 9% higher probability choosing WCL over LOS for a hotel information.

This outcome somehow proves that visualizers prefer word clouds as product information format for certain product categories.

Combine the conclusions made above, we can conclude that verblizers generally recall better than visualizer no matter for LOS or WCL, while visualizer prefers WCL over LOS for some certain products even they do not recall WCL better than LOS. Maybe they enjoy seeing WCL. Information in a word cloud is still words, and not to mention that the recall questions are in words these are the possible reasons that verbalizers recall WCL better. It's easier to recall when the statement is short. List of statements is clearly longer than word clouds information.

Recall_WL sensitiveness testing

variable	Coeff	Std. Error	VIF
(Constant)	-0.065	0.164	
Size2_U	0.067	0.221	101.952
Size3_U	-0.257	0.264	108.524
Size4_U	0.631*	0.329	99.469
Size5_U	0.670*	0.385	99.954
Per_imp_riskWL	0.000	0.020	1.317
Prob_mispWL	0.000	0.014	1.284
Per_sym_signWL	0.000	0.013	1.544
HedonicWL	0.001	0.012	1.706
InterestWL	0.000	0.016	1.482
VerbalScaleWL	0.002	0.003	2.501
VisualScaleWL	-0.001	0.003	2.499
size2_vis	0.002	0.004	46.922
size3_vis	0.004	0.005	49.223
size4_vis	0.004	0.006	44.700
size5_vis	-0.003	0.006	42.509
size5_ver	-0.013*	0.008	58.128
size4_ver	-0.015**	0.007	59.372
size3_ver	0.005	0.005	63.396
size2_ver	-0.002	0.005	62.213
No Observations	1930		
R Square	0.028		

*** p-value < 0.01
** p-value < 0.05
* p-value < 0.1

Table 11

In this model the sensitiveness of a size change in the word cloud is tested among visualizer and verbalizer. In order to test this, interaction variable of size and vvq score are created. 'Size2_vis' means what is the partial effect of size 2 when verbal score increases by one.

Size 4 and 5 are significant, size 5 word has 67% higher possibility to be recalled than a size 1 word. Yet, the correlation is too high among the predicting variables, the magnitude of effect cannot be relied on while the test power can still be trusted. It shows that for the bigger size words, the recall rate decreases while the visual score increases. Thus to conclude visualizer to some degree actually is more sensitive to size effect.

Recall_LOS sensitiveness testing

variable	Coeff	Std. Error
(Constant)	-0.002	0.173
Section_1	-0.173	0.222
Section_2	0.126	0.199
Per_imp_riskLOS	0.006	0.019
Prob_mispLOS	-0.008	0.013
Per_sym_signLOS	0.004	0.012
HedonicLOS	-0.001	0.011
InterestLOS	-0.002	0.017
VerbalScaleLOS	0.001	0.003
VisualScaleLOS	0.000	0.003
sec1_vis	0.005	0.004
sec1_verb	-0.001	0.005
sec2_verb	-0.002	0.004
sec2_vis	-0.003	0.004
No Observations	2197	
R Square	0.006	

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 12

Table 12 shows that there is no order effect and the interaction effects do not exist. In the restricted model (model 9) only for testing order effect section 2 has significantly lower recall rate than the other 2 sections. Here it is possible the high colinearity reduced the significance level.

	N	mean WL	Std. Error	p-value	mean LOS	Std. Error	p-value
		0.153	0.031	0.432	0.229	0.038	0.918
verblizer	93						
visualizer	116	0.120	0.028		0.224	0.028	

Table 13

One-way ANOVA is applied to measure whether the mean recall rate of verbalizer and visualizer differs for WCL and LOS. It is surprise to find out that he mean recall rate of the 2 groups are statisticly the same. No matter for WCL recall or LOS recall, meaning cognitive style, visualizer and verbalizer in specific, do not affect the recall rate in this study.

Again one-way ANOVA is used to determine whether the correct rate of recall is different if the size of the word cloud itself is different. The size of word cloud here means the quantity of words in a word cloud. The 2 groups in this test are

group 3&8 and group 6&7. For group 3&8 (word cloud is used to depict a hotel) the word cloud size is 20 while for group 6&7 (word cloud is used to depict a detergent) the word cloud size is 12. In the datasheet, let 1 stands for the big size of word cloud, and 2 stands for the small size of word cloud. The outcome is shown in the table below:

The relationship between recall rate and WL size/LOS length

Group	N	Mean	Std. Error	p-value
long list	50	0.1638	0.03992	0.428
short list	51	0.215	0.05031	
big size	51	0.0132	0.03303	0.000
small size	55	0.3108	0.04803	

Table 14

The test statistic shows it is highly significant that the mean recall score of big size word cloud is higher than the mean recall score of small size word cloud. While the length of list of statements did not have an effect on the mean recall rate. The groups compared are group 3&8 vs group 2&5. Detergent and Compact camera respectively. 7 statements describing a detergent while 14 statements describing a compact camera.

Conclusion and Discussion

In general it is not a study with ideal outcomes still it generates some insights.

1) Within this study, size effect that bigger size words are recalled better has been proved while order effect says the middle statements is given least attention. The effect of length of list is not verified, yet bigger size word clouds leads to less recall. It could be too much information that leads to information chaos. 2) Visualizers and verbalizers somehow differ in ability of remembering

word clouds and list of statements as product information. Verbalizers recall WCL better when the word size is relatively small. Visualizers did not show any effects, it seems visualizers does not affect recall rate. 3) The statistic shows that in this study involvement level is totally not able to predict an individual's preferences of information format. Instead it is found that visualizers prefer word cloud as product information when it comes to SLR camera or Hotel. 4) Verbalizers are more sensitive to size effect than visualizers, when size get bigger verbalizers generally recall less. For order effect neither visualizers nor verbalizers show any sensitiveness. Visualizers do not help recall word clouds.

Based on the test results, some managerial implications could help companies count on product information more. This kind of product information segmentation would get better recall rate of the contents. When using word clouds as product information, put the biggest selling point with the largest word size to arouse attention. Verbalizers generally are with higher ability recalling information in word clouds, while visualizers somehow enjoy themselves more when viewing product information with word clouds (depending on the product category). It shows that there is high potential for word clouds serving as product information. A customer's cognitive style can be verified by several clicks on the website according to Hauser et al. (2009).

Although the study was carefully prepared, there are some shortcomings and limitations. On the level of questionnaire design and data collection, several initiatives can be done. With so many insignificant independent variables, more responses could have help. The length of questionnaire is long; it takes at least 10 minutes to fill in seriously for a person who commands good English. It significantly lowers the reliability of the answers. Several things could have done to make this better, first is to give better and clear instructions. Make sure

respondents all know what is the tested product. For example show a picture of SLR camera in the first sight would mitigate misunderstandings. Clear and visible explanations of what the information format would be good, since word cloud is new and not everybody knows what it is. For a long questionnaire much more motivated incentive can make respondents willing to contribute more. Such as mention that the prize is correlated with one of the questions, but by not telling them which one.

On the level of data analysis, there were not perfectly match data when testing sensitiveness. This can be the main reason that two groups do not show any sensitiveness difference (except for the negative relationship between verbalizers and size effect). When testing whether the effect of length of list of statements and size of word clouds, there were not paired groups. In other word the product category was not controlled. The data could have been like for the same product with different length of list of statements and different size of word clouds.

This study is conducted only with several products, not categorized. For further study it is suggested that either between category levels or within category level products should be selected as research items.

Appendix 1

Questionnaire, version 6

Hello everyone, welcome to this page and thanks for your participation in advance. This survey is conducted for my thesis, you will be asked a few questions which will take approximately 5-10 minutes.

Your answers will help me quite a lot, in return I will choose 2 lucky stars randomly from all of you who give a valid answer sheet. The ones who are chosen can get a mystery gift. (values 100 euro each or more, anyone is interested please fill in your e-mail add at the end of the survey)

Now let's get started...

This is a scale for measuring involvement level, which contains 16 questions and you should choose to what extent do you agree with each statement below. HOTEL is chosen as the research item here.

	Totally Disagree	Disagree	Neither Agree nor Disagree	Agree	Totally Agree
1. When you choose HOTEL, it is not a big deal if you make a mistake. *	○	○	○	○	○
2. It is really annoying to stay at a HOTEL that is not suitable.	○	○	○	○	○
3. If, after I booked a HOTEL, my choice prove to be poor, I would be really upset.	○	○	○	○	○
4. Whenever one books a HOTEL, one never really knows whether they are the ones that should have been booked.	○	○	○	○	○
5. When I face a great list of HOTELS, I always feel a bit at a loss to make my choice.	○	○	○	○	○
6. Choosing HOTEL is rather complicated.	○	○	○	○	○
7. When one books HOTEL, one is never certain of one's choice.	○	○	○	○	○
8. You can tell a lot about a person by the HOTEL he or she just chooses.	○	○	○	○	○
9. The HOTEL I book gives a glimpse of the type of man/woman I am.	○	○	○	○	○
10. The HOTEL you book tells a little bit about you.	○	○	○	○	○
11. It gives me pleasure to book HOTELS.	○	○	○	○	○
12. Booking HOTEL is like buying a gift for myself.	○	○	○	○	○
13. HOTEL staying is somewhat of a pleasure to me.	○	○	○	○	○
14. I attach great importance to HOTEL.	○	○	○	○	○
15. One can say choosing HOTEL interests me a lot.	○	○	○	○	○
16. HOTEL is a topic which leaves me totally indifferent. *	○	○	○	○	○

This is a scale for measuring involvement level, which contains 16 questions and you should choose to what extent do you agree with each statement below. The product choser here is a DETERGENT.

	Totally Disagree	Disagree	Neither Agree nor Disagree	Agree	Totally Agree
1. When you choose detergent, it is not a big deal if you make a mistake. *	○	○	○	○	○
2. It is really annoying to purchase detergent that are not suitable.	○	○	○	○	○
3. If, after I bought detergent, my choice prove to be poor, I would be really upset.	○	○	○	○	○
4. Whenever one buys detergent, one never really knows whether they are the ones that should have been bought.	○	○	○	○	○
5. When I face a shelf of detergent, I always feel a bit at a loss to make my choice.	○	○	○	○	○
6. Choosing detergent is rather complicated.	○	○	○	○	○
7. When one purchases detergent, one is never certain of one's choice.	○	○	○	○	○
8. You can tell a lot about a person by the detergent he or she just chooses.	○	○	○	○	○
9. The detergent I buy gives a glimpse of the type of man/woman I am.	○	○	○	○	○
10. The detergent you buy tells a little bit about you.	○	○	○	○	○
11. It gives me pleasure to purchase detergent.	○	○	○	○	○
12. Buying detergent is like buying a gift for myself.	○	○	○	○	○
13. detergent is somewhat of a pleasure to me.	○	○	○	○	○
14. I attach great importance to detergent.	○	○	○	○	○
15. One can say detergent interests me a lot.	○	○	○	○	○
16. detergent is a topic which leaves me totally indifferent. *	○	○	○	○	○

On the next page, you will see a combination of product and product information displayed. Please look at it as if you have seen an advertisement in a magazine. Imagine the product displayed is exactly the one you want so that you want to know everything about it.

(there are 4 pictures in total that may not appear directly due to net conditions. please wait while it loads, thank you.)

Product : Hotel

Product Information Format: List of Statements

- 5-star hotel located just steps from the Champs-Elysées, metro stations around
- With private terraces that command all of Paris
- Lovingly restored 18th-century tapestries
- A defining spirit of elegance and charm
- The Health Club offers a full range of state-of-the-art exercise and cardiovascular equipment, fitness instructors are available
- Offering a comprehensive menu of skin and body treatments, as well as saunas, whirlpools and a pool.
- With 24 hours' notice, able to arrange reliable babysitting services.
- 24-hour business services
- Multiple room types including family rooms and suites
- Exquisite 2 Michelin-star dining with beautiful views of the Hotel's courtyard
- Free Wifi and Satellite TV
- Free parking and shuttle bus

Product: Detergent

Product Information Format: Word Clouds

How old are you?

What is your Nationality?

What is your current education level?

- ⃝ Bachelor
- ⃝ Master
- ⃝ PhD
- ⃝ others
- ⃝ High School

What is your gender?

- ⃝ Male
- ⃝ Female

What is your working status?

- ⃝ full-time employed
- ⃝ part-time
- ⃝ student
- ⃝ others

What is your monthly salary? (in Euro)

- ⃝ < 1000
- ⃝ between 1000-1500
- ⃝ between 1500-2000
- ⃝ between 2000-2500
- ⃝ >2500

Please choose the answer best describes yourself.

	always true	usually true	somewhat true somewhat false	usually false	always false
1. I enjoy doing work that requires the use of words.	○	○	○	○	○
2. There are some special time in my life that I like to relive by mentally 'picturing' just how everything looked.	○	○	○	○	○
3. I can never seem to find the right word when I need it.	○	○	○	○	○
4. I do a lot of reading.	○	○	○	○	○
5. When I'm trying to learn something new, I'd rather watch a demonstration than read how to do it.	○	○	○	○	○
6. I think I often use words in the wrong way.	○	○	○	○	○
7. I enjoy learning new words.	○	○	○	○	○
8. I like to picture how I could fix up my apartment or a room if I could buy anything I wanted.	○	○	○	○	○
9. I often make written notes to myself.	○	○	○	○	○
10. I like to daydream.	○	○	○	○	○
11. I generally prefer to use a diagram rather than a written set of instructions.	○	○	○	○	○
12. I like to 'doodle' drawing things	○	○	○	○	○
13. I find it helps to think in terms of mental pictures when doing many things.	○	○	○	○	○
14. After I meet someone for the first time, I can usually remember what they look like, but not much about them.	○	○	○	○	○
15. I like to think of synonyms for words.	○	○	○	○	○
16. When I have forgotten something I frequently try to form a mental 'picture' to remember it.	○	○	○	○	○
17. I like learning new words.	○	○	○	○	○
18. I prefer to read instructions about how to do something rather than have someone show me.	○	○	○	○	○
19. I prefer activities that don't require a lot of reading.	○	○	○	○	○
20. I seldom daydream.	○	○	○	○	○
21. I spend very little time attempting to increase my vocabulary.	○	○	○	○	○
22. My thinking often consists of mental 'pictures' or images.	○	○	○	○	○

Choose 'yes' if you have seen the content displayed as product information before, choose 'no' if you haven't. Please do not look back for answers, there is no right or wrong answers, as long as you choose honestly, it is the best. Thanks!!!

	have you seen this before?	
	yes	no
5-star hotel located just steps from the Champs-Elysées, metro stations around	○	○
with best Eiffel Tower View in the city	○	○
With private terraces that command all of Paris	○	○
Free parking and shuttle bus	○	○
Free Wifi and Satellite TV	○	○
Welcome flowers for regular customers	○	○
Lovingly restored 18th-century taperstries	○	○
A defining spirit of elegance and charm	○	○
The Health Club offers a full range of state-of-the-art exercise and cardiovascular equipment, fitness instructors are available	○	○
Offering a comprehensive menu of skin and body treatments, as well as saunas, whirlpools and a pool.	○	○
Free seasonal Fruites available by calling room service	○	○
Guest designed sweet morning call	○	○
With 24 hours' notice, able to arrange reliable babysitting services.	○	○
Multiple room types including family rooms and suites	○	○
Exquisite 2 Michelin-star dining with beautiful views of the Hotel's courtyard	○	○
24-hour business services	○	○

	have you seen this before?	
	yes	no
Dirt is Good	○	○
Feel Free to Explore	○	○
Gentle Care	○	○
Super Whitening	○	○
Cleaner Planet	○	○
Gorgeous Fragrances	○	○
Reducing Package Waste	○	○
Sanitation for all	○	○
Wash Effective	○	○
Saving Energy	○	○
Long lasting freshness	○	○
Small Size, Big Result	○	○

Please choose the preferred information format for each product below. 'WL' stands for word cloud, 'LOS' stands for list of statements

	DIGITAL SLR CAMERA		COMPACT CAMERA		HOTEL		DETERGENT	
	WL	LOS	WL	LOS	WL	LOS	WL	LOS
choose preferred information format	○	○	○	○	○	○	○	○

Thank you again for filling in the survey and for anyone who is interested in the 'mystery gift' please indicate your e-mail address in the text box below. I promise it will not be used for other purposes.

Appendix 2
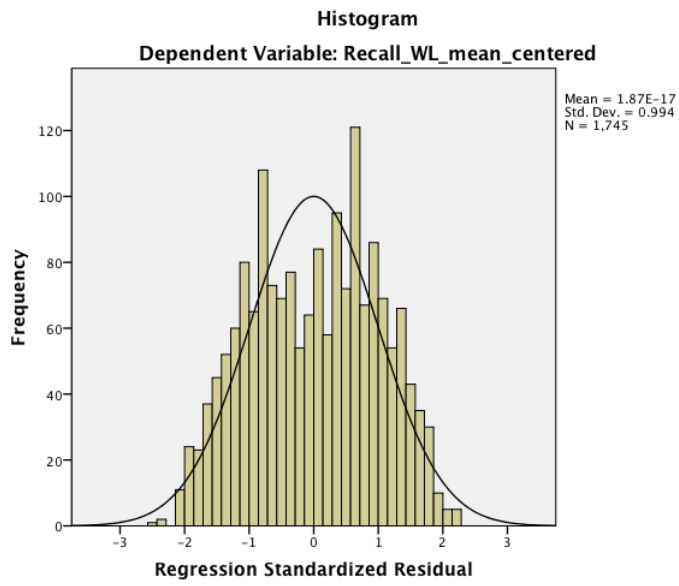
Figure 1-a : Distribution of residuals

Figure 2-a: pp-plot

Scatterplot
Dependent Variable: Recall_WL_mean_centered
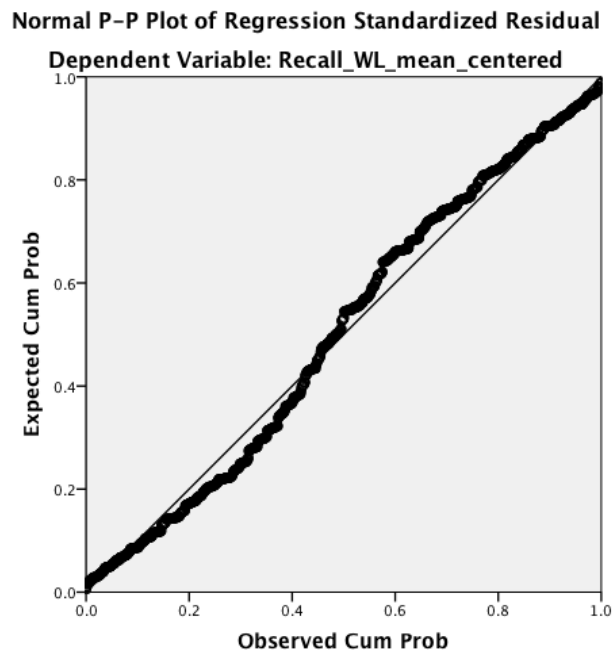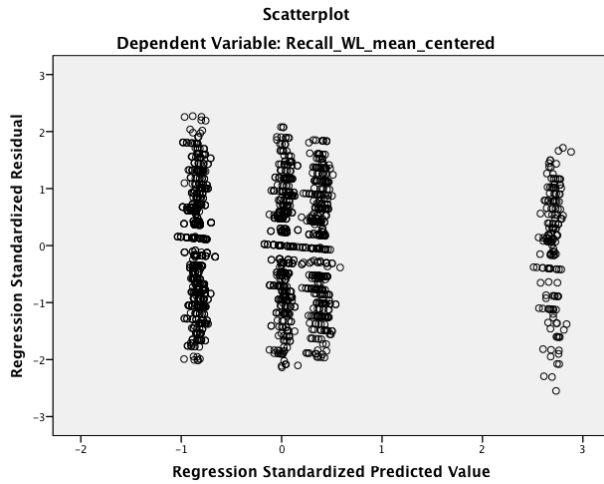
Figure 3-a : Scatterplot of Residuals

What is your current education level?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	959	49.7	51.0	51.0
	Master	730	37.8	38.8	89.7
	PhD	44	2.3	2.3	92.1
	others	48	2.5	2.6	94.6
	High School	101	5.2	5.4	100.0
	Total	1882	97.5	100.0	
Missing	System	48	2.5		
Total		1930	100.0		

Table 1-a

What is your working status?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	full-time employed	521	23.7	24.3	24.3
	part-time	206	9.4	9.6	33.9
	student	1329	60.5	62.0	95.9
	others	89	4.1	4.1	100.0
	Total	2145	97.6	100.0	
Missing	System	52	2.4		
Total		2197	100.0		

Table 2-a

Regression models with Recall_Wl_mean_centered as dependent variable

variable	Model 1-a			Model 2-a			Model 3-a		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	-0.037	0.175		-0.033	0.159		-0.055***	0.015	
Size2_U	0.055**	0.025	1.207	0.055**	0.025	1.207	0.062***	0.024	1.209
Size3_U	0.079***	0.029	1.182	0.079***	0.029	1.181	0.073***	0.027	1.176
Size4_U	0.225***	0.037	1.112	0.225***	0.037	1.112	0.228***	0.035	1.113
Size5_U	0.075*	0.042	1.088	0.075*	0.042	1.088	0.073*	0.040	1.085
Per_imp_riskWL	0.000	0.023	1.514	0.001	0.023	1.492			
Prob_mispWL	-0.001	0.015	1.368	-0.001	0.015	1.364			
Per_sym_signWL	0.000	0.014	1.659	0.000	0.014	1.657			
HedonicWL	0.002	0.013	1.810	0.002	0.013	1.765			
InterestWL	0.000	0.018	1.636	0.000	0.017	1.635			
VerbalScaleWL	0.000	0.002	1.218	0.000	0.002	1.206			
VisualScaleWL	0.000	0.002	1.151	0.000	0.002	1.148			
age	0.000	0.003	1.536	0.000	0.003	1.529			
gender	0.002	0.022	1.126	0.002	0.021	1.121			
EDU_BACHELOR	0.002	0.083	16.758	-0.001	0.045	4.983			
EDU_MASTER	0.002	0.082	16.040	-0.002	0.045	4.841			
EDU_PHD	0.002	0.106	2.709	-0.001	0.079	1.520			
EDU_HIGH	0.005	0.095	3.956						
INCOME_CON	0.000	0.000		0.000	0.000	1.617			
Part_time	-0.007	0.038	1.452	-0.007	0.038	1.438			
Student	-0.002	0.030	2.016	-0.002	0.030	1.987			
No Observations (n)	1745			1745			1745		
R Square	0.022			0.022			0.023		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 3-a

In model 1-a there are 2 variables that have VIF value above 15, indicates multicolinearity problem exists. Remove the variable that has the highest VIF value would work, but to remove education level of bachelor simply aggregates 'bachelor' with 'other' segment. The frequency table of education level shows that only 101 choose 'highschool', 48 choose 'others' out of 1745 responses. Although there are 44 counts for 'phd' students, model 2-a is generated by aggregating 'others' with 'highschool'. 'Others' is too far away from 'phd', it is not logical to keep them together in the same group. As can be seen from the table, all the value of VIF is below 5, which means the problem of multicolinearity is solved. R^2 is rather low, it remains at 2.2%, which indicates that it only explains 2.2% of the variance.

Regression models with WL_mean correct rate as dependent variable

variable	Model 4-a			Model 5-a			Model 6-a		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	0.725	0.684		0.322	0.589		-0.412	0.320	
Age	-0.031	0.037	71.623	-0.039	0.036	67.565	0.003	0.005	1.560
Gender	-0.049	0.048	1.447	-0.047	0.046	1.263	-0.060	0.044	1.181
imp_riskWL	-0.098	0.101	7.498	0.041	0.047	1.527	0.034	0.046	1.467
misp_WL	0.073	0.069	7.262	0.030	0.032	1.460	0.030	0.031	1.430
symbol_sign_WL	-0.052	0.058	7.405	-0.018	0.028	1.697	-0.017	0.028	1.688
hedonicWL	0.032	0.056	8.855	-0.013	0.029	2.281	-0.007	0.029	2.174
interestWL	-0.048	0.074	7.454	-0.010	0.037	1.747	-0.020	0.035	1.617
verbWL	0.002	0.006	2.118	0.004	0.006	1.985	0.005	0.006	1.949
visualWL	0.004	0.005	2.641	0.003	0.005	2.305	0.002	0.005	2.284
EDU_BACHELOR	0.072	0.188	22.510	0.017	0.177	19.127	0.093	0.089	4.817
EDU_MASTER	0.161	0.187	21.192	0.071	0.176	18.096	0.121	0.088	4.547
EDU_PHD	-0.074	0.235	3.557	-0.080	0.221	3.016	-0.024	0.155	1.493
EDU_HIGH	-0.121	0.219	5.998	-0.149	0.206	5.127			
INCOM_CON	0.000	0.000	71.614	0.000	0.000	63.317	0.000	0.000	1.635
Fulltime	0.050	0.067	2.170	0.073	0.064	1.925			
Part_time	-0.085	0.076	1.441	-0.060	0.075	1.348			
age2	0.000	0.001	111.140	0.001	0.001	102.507			
age_income	0.000	0.000	113.317	0.000	0.000	101.083			
SLR	0.107	0.500	115.746	0.196***	0.061	1.670	0.196***	0.061	1.640
COMPACT	-0.289	0.451	95.545	-0.001	0.060	1.632	-0.014	0.059	1.587
HOTEL	-0.869*	0.464	103.906	0.263***	0.067	2.082	0.267***	0.067	2.063
imp_slr	0.003	0.144	109.228						
misp_slr	-0.156	0.094	43.540						
symbol_slr	0.023	0.080	26.697						
hedonic_slr	0.035	0.083	37.976						
interest_slr	0.123	0.109	48.940						
interest_compact	0.084	0.104	46.070						
hedonic_compact	-0.075	0.081	40.817						
symbol_compact	-0.012	0.081	28.227						
misp_compact	-0.032	0.090	39.615						
imp_compact	0.120	0.144	119.687						
imp_hotel	0.318**	0.129	81.844						
misp_hotel	-0.012	0.088	29.829						
symbol_hotel	0.112	0.084	19.695						
hedonic_hotel	-0.128	0.078	16.685						
interest_hotel	0.070	0.112	39.855						
cognitive_style	-0.071	0.071	3.217	-0.035	0.069	2.912	-0.015	0.068	2.789
No Observations	192			192			192		
R Square	0.354			0. 263			0. 246		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 4-a

Regression models with Recall LOS as dependent variable

variable	Model 7-a			Model 8-a			Model 9-a			Model 10-a		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	0.048	0.161		0.061	0.140		0.043	0.110		0.028	0.017	
Section_1	-0.016	0.025	1.428	-0.016	0.025	1.428	-0.029	0.024	1.429	-0.029	0.024	1.429
Section_2	-0.045*	0.023	1.439	-0.045*	0.023	1.436	-0.055**	0.022	1.435	-0.056**	0.022	1.429
Per_imp_riskLOS	0.007	0.020	1.341	0.007	0.020	1.321	0.007	0.019	1.282			
Prob_mispLOS	-0.011	0.015	1.486	-0.010	0.014	1.457	-0.008	0.013	1.260			
Per_sym_signLOS	0.005	0.013	1.642	0.005	0.012	1.605	0.005	0.012	1.554			
HedonicLOS	-0.001	0.012	1.914	-0.001	0.012	1.905	-0.001	0.011	1.922			
InterestLOS	-0.003	0.019	1.938	-0.003	0.019	1.935	-0.001	0.017	1.791			
VerbalScaleLOS	0.000	0.002	1.162	0.000	0.002	1.157	0.000	0.002	1.100			
VisualScaleLOS	0.000	0.002	1.064	0.000	0.002	1.056	0.000	0.001	1.029			
Age	-0.001	0.003	1.598	-0.001	0.003	1.586						
Gender	-0.005	0.021	1.148	-0.005	0.020	1.124						
EDU_BACHELOR	0.016	0.094	23.793	0.004	0.044	5.177						
EDU_MASTER	0.012	0.094	22.912	-0.001	0.044	5.022						
EDU_PHD	0.027	0.111	3.890	0.015	0.072	1.640						
EDU_HIGH	0.015	0.102	5.301									
INCOM_CON	0.000	0.000	1.663	0.000	0.000	1.591						
Part_time	0.007	0.038	1.416									
Student	0.002	0.029	2.028	0.000	0.025	1.550						
No Observations	1984			1984			2197			2197		
R Square	0.003			0.003			0.003			0.003		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 5-a

Regression models with LOS mean correct rate as dependent variable

variable	Model 11-a			Model 12-a			Model 13-a		
	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF	Coeff	Std. Error	VIF
(Constant)	0.198	0.690		0.231	0.660		-0.025	0.337	
Age	-0.031	0.043	70.552	-0.033	0.041	64.797	-0.006	0.006	1.530
Gender	0.004	0.055	1.320	-0.004	0.052	1.216	0.009	0.051	1.170
imp_riskLOS	0.023	0.079	3.681	0.051	0.049	1.438	0.044	0.048	1.408
misp_LOS	0.074	0.069	5.295	0.004	0.034	1.306	0.000	0.033	1.287
symbol_sign_LOS	-0.026	0.066	7.434	-0.009	0.030	1.585	-0.011	0.029	1.522
hedonicLOS	0.008	0.076	11.776	-0.032	0.034	2.403	-0.024	0.033	2.319
interestLOS	-0.012	0.081	5.785	0.020	0.049	2.205	0.023	0.049	2.165
verbLOS	0.006	0.005	1.259	0.007	0.005	1.148	0.007	0.005	1.135
visualLOS	0.001	0.004	1.215	0.000	0.004	1.101	0.000	0.004	1.076
EDU_BACHELOR	0.096	0.209	19.488	0.179	0.197	17.981	-0.005	0.100	4.565
EDU_MASTER	0.161	0.210	18.867	0.234	0.198	17.323	0.040	0.100	4.431
EDU_PHD	0.019	0.268	3.259	0.109	0.250	2.918	-0.082	0.178	1.477
EDU_HIGH	0.163	0.244	5.267	0.222	0.234	5.013			
INCOM_CON	0.000	0.000	71.139	0.000	0.000	61.912	0.000	0.000	1.659
Fulltime	-0.160**	0.079	2.109	-0.150**	0.074	1.907			
Student							0.117*	0.061	1.600
Part_time	-0.018	0.092	1.482	-0.025	0.086	1.336			
age2	0.000	0.001	102.063	0.000	0.001	95.415			
age_income	0.000	0.000	113.474	0.000	0.000	99.540			
SLR	-0.020	0.114	4.221	-0.082	0.076	1.956	-0.077	0.075	1.908
COMPACT	-0.259***	0.074	1.784	0.242***	0.069	1.626	-0.234	0.069	1.603
HOTEL	0.104	0.120	4.925	0.027	0.072	1.807	0.027	0.072	1.788
cognitive_style	-0.041	0.053	1.232	-0.023	0.049	1.094	-0.017	0.049	1.090
imp_slr	0.047	0.123	55.833						
mis_slr	-0.037	0.105	42.673						
sym_slr	-0.073	0.096	31.029						
hedonic_slr	0.025	0.114	60.439						
interest_slr	0.017	0.153	78.895						
imp_com	0.139	0.108	44.494						
mis_com	-0.1678*	0.096	30.760						
sym_com	0.004	0.094	27.961						
hedonic_com	-0.090	0.108	42.040						
intersest_com	0.088	0.130	48.099						
imp_hotel	-0.048	0.110	49.115						
misp_hotel	-0.020	0.096	29.469						
sym_hotel	0.072	0.087	29.349						
hedonic_hotel	-0.051	0.115	56.019						
interest_hotel	0.076	0.142	63.152						
No Observations	192			192			192		
R Square	0.210			0.162			0.138		

*** p-value < 0.01

** p-value < 0.05

* p-value < 0.1

Table 6-a

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