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Object and Context in perception and Memory: Polish-Chinese Comparison of Analytic and Holistic Thinking

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INTRODUCTION

On the basis of many researches in nowadays cross-cultural psychology with respondents from Western and Asian culture, some of the psychologists, like Kai Ping Peng and Richard Nisbett (1999), agreed to develop terms of *holistic* and *analytic thinking* that describe differences between Asian and Euro-American cognitive styles (Masuda, Nisbett 2001; Norenzayan, et al., 2001; Choi, Nisbett, 2000; Ji et al., 2000; Morris, Peng, 1994). Probably the widest range of examples supporting such a differentiation occurs in "*The Geography of Thought—How Asians and Westerners Think Differently…and Why"* by Nisbett (2003). According to it and other articles many researches indicate that East Asians, more than Westerners, explain events with reference to the context (Nisbett, 2003). East Asians also attend to the contextual information, and especially relationships, more than Americans or European represents do. Nisbett and Masuda (2001a) argued that there are other significant psychological differences between East Asians and Westerners. Those differences are visible in causal attributions, reasoning about contradiction and categorization. They are probably rooted in long-standing differences between East Asian and Western civilizations, whose intellectual traditions can be traced back to Aristotle and Confucius.

Nisbett and his colleagues (2001a, 2001b) maintained that contemporary Westerner's mentalities and system of thinking are highly influenced by analytic intellectual tradition rooted in ancient Greece. That analytic tradition can be defined as:

> *"… involving detachment of the object from its context. This is a tendency to focus on attributes of the object in order to assign it to categories, and a preference for using rules about the categories to explain and predict the object's behaviour. Inferences rest in part on the practice of decontextualizing structure from content, the use of formal logic, and avoidance of contradictions"* (Nisbett et al., 2001b, p. 293).

The above is contrasted with Asian cultural style of thinking which the authors characterize in the following way:

> *"By contrast, intellectual traditions in ancient China such as Taoism, Chinese Buddhism and Confucianism are more holistic in character. Holistic thought is*

defined according to Nisbett (2001b) *as involving an orientation to the context or field as a whole, including relationships between a focal object and the field. This is also preference for explaining and predicting events on the basis of such relationships. Holistic approaches rely on experience-based knowledge, are more dialectical and search for the Middle Way between opposing propositions"* (Masuda, Nisbett, 2001a, p. 923).

The most important and prototype for the research reported in this contribution are the recent works on Object and its Context perception and memory conducted by Masuda and Nisbett (2001a). Their goal was to "examine whether East Asians attended to the context more than did the Americans. In study 1, Japanese (being holistic) and Americans (analytic) watched animated vignettes of underwater scenes and reported the contents. In a subsequent recognition test, they were shown previously seen objects as well as new objects, either in their original setting or in novel setting, and than were asked to judge whether they had seen the objects. Study 2 replicated the recognition task using photographs of wildlife.

The results showed that Japanese: (1) made more statements about contextual information and relationships than Americans did, (2) recognized previously seen objects more accurately when they saw them in their original setting rather than in the novel setting, whereas this manipulation had relatively little effect on Americans" (Nisbett, Masuda, 2001a, p. 922).

Based on their studies, we decided to check whether the similar tendencies refer to the Human Objects and their cultural Backgrounds, rather than the "natural". In this project we examined: (a) the significance of Object and Context, (b) the memory for the stimuli and (c) the evaluation of out- and in-group members. In this experiment the two groups are Chinese (in place of Japanese) and Poles (instead of Americans). Other differences in compare to the prototype study will be presented later, in the method section.

METHOD

Participants

The research was conducted in China and in Poland. Among Chinese participants there were 64 students from Beijing University, Normal University, Beijing Language and Culture University, and Chinese Academy of Science. There were an equal number of Polish participants: students from University of Warsaw, Warsaw School of Social Psychology, European School of Law and Administration, and Polish Academy of Sciences. Proportions of female participants were 61 % in Beijing sample and 69 % in Warsaw sample.

Research design

With Chinese and Polish participants, a cross-cultural experiment on Object-Background pictorial perception and picture recognition memory was run within the structure of the following research design.

Table 1
Schema of Research

	Subject's variables: 2(nationality: Chinese, Polish) × 2(sex)					
Architectural Background	Human Background					
	1. Yes (present)		0. No (absent)	1. Yes (present)		0. No (absent)
	Figure			*Figure*		
	Physical Features	*Sex*	*Physical Attractiveness*	*Physical Features*	*Sex*	*Physical Attractiveness*
0.Landscape 1.Slum 2.Apt.Building 3.Villa	1.Oriental	1.male	1. high	2. European	1.male	1. high
0.Landscape 1.Slum 2.Apt.Building 3.Villa	1.Oriental	1.male	2. low	2. European	1.male	2. low
0.Landscape 1.Slum 2.Apt.Building 3.Villa	1.Oriental	2. female	1. high	2. European	2. female	1. high
0.Landscape 1.Slum 2.Apt.Building 3.Villa	1.Oriental	2. female	2. low	2. European	2. female	2. low

Experimental variables were embedded in characteristics of the photographs, which served as research materials. In line with the methodology introduced by Masuda and Nisbett (2001), Figure and Background attributes of the pictures were manipulated. As to the Figure characteristics they formed a 2^3 classification: 2 physical features (Oriental vs. European) × 2 sex (female vs. male) × 2 physical attractiveness (high vs. low). This resulted in eight conditions of focal Figure, on which a 4×2 classification of Background factors was imposed: 4 architectural forms (control absent, villa, apt. building, slum) × 2 human background (control absent, present). That would also give eight experimental conditions of picture Background factors. Each of the Figure characteristics matched each of Background conditions, resulting in 8×8 = 64 pictures.

Photos

Pictures of eight actors were shot by the author's camera or they were taken from Polish and Chinese websites in the Internet. European vs. Oriental and Female vs. Male features were made obvious to any observer. Physical attractiveness is more judgmental and we used jurors before deciding on final selection. Actors considered as attractive were also well dressed and showing pleasant facial expressions. Actors considered as non-attractive had facial scars, were shabbily dressed and had matted hair.

The *Architectural Background* was represented by buildings which differed by degree of elegance and material well-being. We used a photo of a Villa (a free-standing family house), luxurious for Polish, as well as for Asian, criteria; a modern Apartment Building for middle-class residents and a poor, almost run-down Slum. Finally, the control condition consisted of a non-architectural, landscape with blue sky and green grass. Effort was taken to have the architectural design "culture-universal" and to avoid distinct cultural connotations in this respect[1]. Pictures of the buildings were chosen and

judged by Poles and Chinese and than revised in a pilot study. That study showed that participants did not treat the buildings as Polish or Chinese and they were not able to say from which part of the world they come. They answered that the buildings could be from both of the continents. Of the three final selections, the Villa and the Apartment Building were snap-shot in Poland; while the Slum was Chinese. The human condition background consisted of two back-staged figures (child and adult) who were behind the focal actor and closer than her/him to the architectural setting.

The final stage of generating experimental pictures consisted of Photo-Shop editing, when figures (focal and backstage) were cast against the material background.

Picture Perception Questionnaire

It was written in Polish and translated into Chinese by Polish translator and one Chinese native speaker. The questionnaire contains a first part where the participants were asked to read the instruction and write personal data and a second part, which was presented eight times to each participant. Each time they were asked to answer the same questions, but referring to other pictures.

The questions rely to:

1) Description of the photo (two open questions and the close ones), for example:

(1) Think that you describe a person seen on a picture to somebody who can't see a photo. Use just a few simple sentences to describe it.

It was done in order to let the participants freely speak about the seen stimuli and to generate their ideas about it.

2) Evaluation the Object—on the basis of the 9 questions asked to the participants, the three scales dealing with stimuli appraisal in analysis section where built. The questions referred to (a) general appraisal of a person, (b) readiness of beginning a relationship with a person, and (c) relatives' acceptation of the relationship with a person, examples:

(2) Do you like the person from the photo? (answer on a scale with seven items)

(5) What kind of relationships would you like to have with a person and how much you would like to have them? (answer on a scale with five items)
(a) neighborhood
(b) your relative's husband/ wife
(c) working together in a company
(d) partner in business

(6) Do you think that your relatives (family, friends) would be happy that you are engaged in one of a given relationships with the person from the picture? (answer on a scale with five items)
(a) neighborhood
(b) your relative's husband/ wife
(c) working together in a company
(d) partner in business.

Using those questions we were checking the significance of the Object and the Context in various ways.

3) Evaluation of the Background—as below, that time two scales were built on the basis of 5 questions referring to general appraisal of a Background and a readiness to staying there, for example:

(3) Do you like the person's surrounding seen on a photo? (answer on a scale with 7 items)

(7) Would you like to stay in that surrounding? Would you prefer to…(answer on a scale with 5 items)

(a) live there

(b) work there

(c) visiting friends there

(d) have in a neighborhood to have a walk around .

The evaluation of Object or Background are the variables dealing with perceptional hypothesis. We didn't ask about the characteristics of the photo, such as size, high or other, but about the appraisal. By using different scales we checked the importance of the stimuli for the person on three different dimensions. The significance—understanding as the higher evaluation together with the readiness of being in a direct relationship with a stimulus, and the expected acceptation of the significant others of the relationship with it—is predictor of the holistic or analytic way of thinking.

Distracters

There were three pages with a whole range of hexagrams. The task was to choose the correct hexagram, which was shown as an example.

PROCEDURE

Picture presentation and evaluation

Latin square design was used in preparing picture driven experimental conditions. According to it, each combination of Figure and Background characteristics appears once and nothing but once in each package. By this methodology, each research participant was exposed to all experimental conditions but not to all stimuli combinations (each has seen eight pictures; those pictures will be later called "correct" or "already seen"). Accordingly, eight packages were created, each consisting of eight pictures. Eight Chinese and eight Polish participants were randomly assigned to each of these; position order within each package of eight pictures was randomized.

Participants were approached individually. The experimenter showed photo (presentation lasted 10 seconds) and asked the participant to answer 7 questions in which the latter described and evaluated the Object and the Context. The procedure was repeated with 7 other pictures.

After the first phase, the participants took a short break and then engaged in a distraction tasks: they were asked to find hexagrams identical with the examples given. The purpose of this distraction task was to divert participant's attention from the main task, before returning to memory recognition test.

Recognition test.

Participants were shown 64 photos—the representation of all stimuli combinations. They were asked to identify the photos that had actually appeared in the first phase ("correct / already seen"). The participants were asked to put each of the photo into one of the three following boxes: (i) the box for pictures never seen before, (ii) the box for pictures for sure seen before and (iii) the box for photos that participant don't know if he/ she seen it or haven't before.

It is important to add that the procedure is quite similar to the Masuda's and Nisbett's, but with a difference. Nisbett used in his recognition tasks original and novel Backgrounds, that mean previously seen and unseen stimuli. Here we used in a last phase the same Backgrounds, and the main role played the combination of the elements: the Objects seen in a foreground.

The research took 30-60 minutes to be conducted and was carried out individually.

HYPOTHESES

According to the theoretical knowledge, Chinese people—the direct Confucius' inheritors—perform according to the holistic style of perception and memory, while Poles, with their own logic tradition based on the ancient Greek ones, tend to be analytic.

On the bases of Masuda and Nisbett's data, first we anticipated that for Chinese, while it is proved that they are holistic, the Context would be more significant, thus rated higher, notwithstanding the attractiveness of the Background. For Poles, who are the successors of analytic heritage, the Object would be more important and get a higher appraisal.

Second we wanted to check the differences between Poles and Chinese in recognition tasks. On one hand attention to more elements (which is specific for holistic style) may provide more cues to signal a match of previously seen pictures. But on the other hand such a task could be cognitively more demanding for those focusing on a wider range of stimuli. For those both ideas we would post the open question: who would make more mistakes in recognition tasks.

RESULTS

We will present here only some of the statistically significant result, those the most important. They are related to the two subjects: (1) Perceptual Importance of the stimuli and (2) Memory of them.

Perceptual variables: Object and context importance measures

In a first phase of the statistical analyzes, the importance of each of the eight Objects and their Contexts have been checked for each subject. We get eight scales containing 9 items dealing with evaluation of Object and also eight scales with 5 items

evaluating Background. All the items get into the factors. Since the subscales had very high reliabilities, two scales for each picture were computed: Figure and Background appraisal.

To test our first hypothesis, Figure and Background scales for all eight pictures were combined for each subject and a 2 (Nationality) × 2 (Picture features) MANOVA was performed. The results had supported the first hypothesis. Poles and Chinese differed in evaluating Object and Context. The interaction between the subject's nationality and the type of stimulus (Object / Context) turned out to be statistically significant $F(1,124) = 32.920$; $p < 0{,}001$; $Eta^2 = 0.21$. Chinese rated higher Background ($M = 3.28$) than Object ($M = 2.98$), the simple effect was significant: $F(1,126) = 27.232$, $p < 0.001$, contrary to Poles, who preferred the Objects ($M = 3.27$) than Context ($M = 2.98$), with the significant effect $F(1,126) = 8.332$, $p < 0.005$ (see Figure 1).

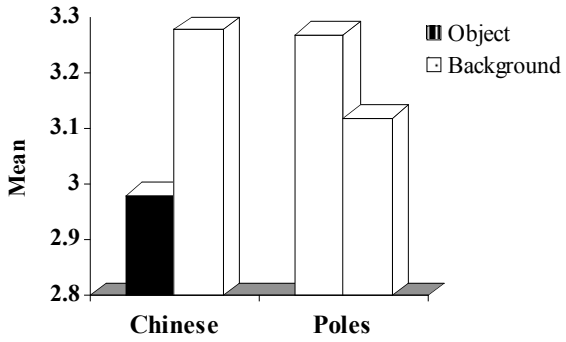

Figure 1
Object and Background Importance Ratings in Poles and Chinese

Also a 3-way interaction between subject's nationality and the type of stimulus turned out to be significant ($F(1,124) = 26.482$; $p < 0.001$; $Eta^2 = 0.176$). Simple effects presents itself differently for Polish ($F(1,126) = 6.93$; $p<0.01$) and Chinese stimuli ($F(1,126) = 50.85$; $p<0.001$). For Chinese the Background is always more important than the Object, irrespectively of the stimulus origin. For Poles, the Object is significantly more important but only when the stimulus is Chinese (see Figure 2).

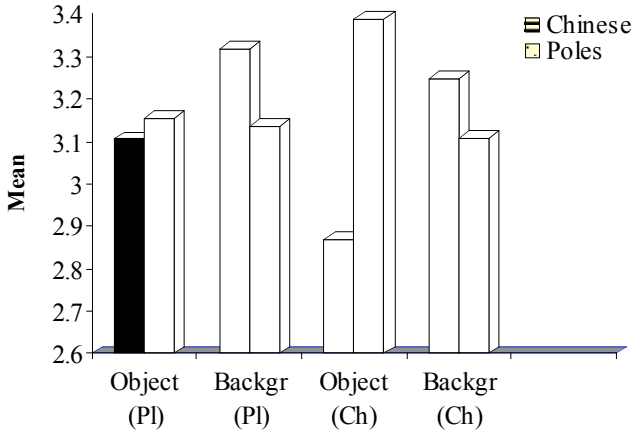

Figure 2

Differences in Importance Ratings of Polish and Chinese Stimuli

Each of the Background was also evaluated differently. One more significant result was observed: the interaction of the Background appraisal (four types of the buildings) with the type of the Object (handsome/ non handsome man and handsome/ non handsome woman), which was $F(9,360) = 33.04$, $p < 0.001$, $Eta^2 = 0.45$. The poorest appraisal got always the slum (regardless the person that was presented with it), the second position of the worse appraisal had block of flats and the villa had similarly high evaluations with the control background.

Memory: Picture recognition

In the recognition test a few categories of indications were defined. Mainly there were (1) "correct" ones, which described photos seen in the first phase of the experiment and shown as seen in the second phase, and (2) some different types of "errors". The first type of errors was called "misses" and that were pictures that have been seen by the participant before, but was not reported in recognition task as seen. The second type is described as "false alarms" and is applied for the pictures that participants indicated as seen, while they have not seen them in the first phase. Each type of error was calculated on the bases of the category that participant choose for each of the picture ("previously seen", "not seen", "I don't know") in comparison to the researcher knowledge if the photo has been or hasn't been shown in the phase one of the experiment.

Generally speaking Poles had more "correct indications" (M = 6.93), so they were more accurate in matching previously seen picture with the category "already seen". In the same time Chinese had them less (M = 6.28) and the effect of nation in that case is statistically significant: $F(1,123) = 6.37$, $p < 0.05$, $Eta^2 = 0.049$. When speaking about "errors" it turned out that Chinese committed more of them (M = 7.51) than Poles (M = 5.22) and the effect is significant: $F(1,123) = 7.081$, $p < 0.05$, $Eta^2 = 0.054$. It means that Chinese more often choose the wrong category (as mentioned before: "previously seen", "not seen") for the photos presented in the recognition task (see Figure 3).

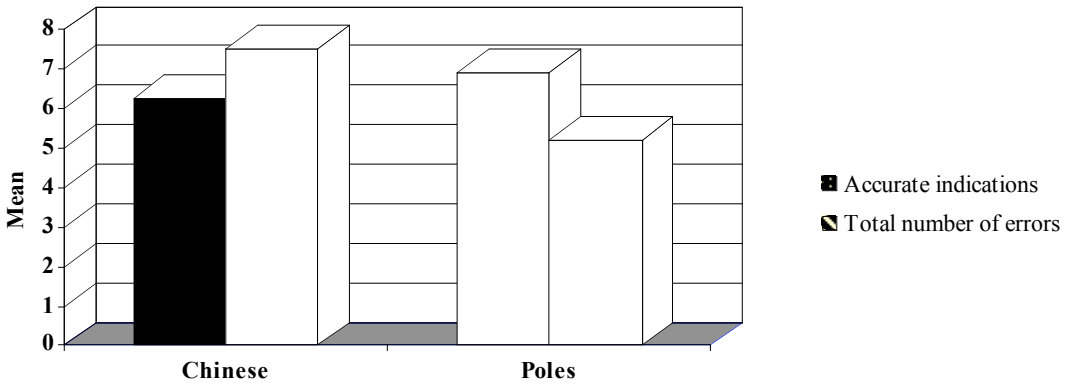

Figure 3
Recognition Tasks: Accurate Indications and Errors

Further analyzes showed up that, not surprisingly, Chinese committed more errors than Poles according to pictures with Polish stimuli (M = 3.09 versus M = 1.61), $F(1,123) = 12.358$, $p < 0.01$, $Eta^2 = 0.091$.

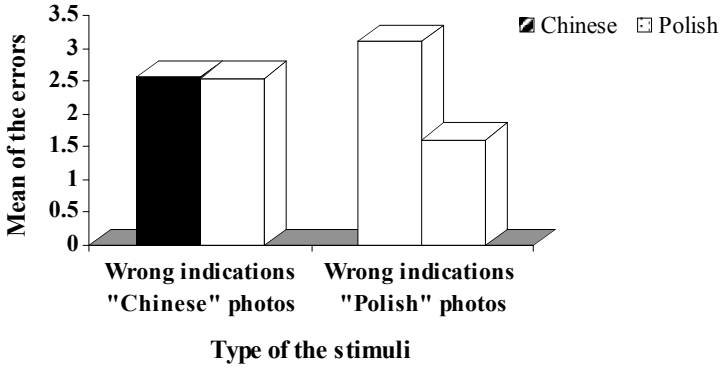

Figure 4
Differences in incorrect indications (errors) of photos presenting Poles (Polish stimuli) and Chinese (Chinese stimuli)

By "Polish stimuli" we meant Polish Objects, while only they differentiated between culture origins, while the Backgrounds were more "culturally neutral" or difficult to match with specific region. In such a situation the task was—by in design—easier for Polish participants who, as analytic thinkers, pay more attention to the Object than for holistic Chinese with their attention to the context. The result underlying ethnic origins of the stimuli and their influence on the recognition is not surprising, while it is obvious that people are worse in recognizing "out-group" members, and for Chinese it had to be even more difficult while they generally pay less attention to the Object. There was not significant difference between participants of Polish and Chinese origins in recognition of Chinese stimuli. Paying attention to the anthropological different Objects could turn out to be an important and effective factor influencing the correctness of indicating. It seems that detaching the Object could be more helpful in that type of the task as it was in the experiment.

The further analysis was based on the division of subcategories of errors. Chinese had more "missings" than Poles (Chinese: M=1.71; Poles: M=1.06; $F(1,123) = 6.37$, $p < 0.05$, $Eta^2 = 0.049$). In case of the "false alarms" (Chinese: M=5.66; Poles: M=4.15; $F(1,123) = 3.727$, $p = 0.056$, $Eta^2 = 0.029$) the significant difference between Polish and Chinese participants was observed only according to the Polish stimuli ($F(1,123) = 13.16$, $p< 0.001$).

From the previous researches (Nisbett, 2003) it is known that holistic style indicates gathering wider range of information, which explain the bigger amount of "false alarms" committed by Chinese, especially that it concerns the Polish, so less familiar and therefore worse recognized, stimuli.

In order to come to better understanding of the errors issue, the relationship between importance of the Object/Background and different types of indications where checked. Generally, the importance of the Object has correlated with almost all kinds of indications, apart from the category "don't know". The scale of significance of the Object correlated with that answer. Detailed results are shown in Table 2**.**

Table 2
Pearson's Correlations between Particular Categories of Indications and Significance of the Background and of the Object

Type of the Indication	Background Significance	Object Significance
All Indications	0.17*	
Correct Indications	-0.18*	
False Alarms	0.23**	
Errors—Chinese Objects	0.22*	
Errors—Polish Objects	0.19*	
Missing	0.18*	
Total Amount of Errors	0.27**	
Answer: *'I don't know"*		0.17*

*Note: * p < . 05; ** p < .01.*

The regression analysis using the variables: nationality of the participants, "correct indications" and "concentration on the Background" have been done. Two last predictors have been standardized. The result showed that the mean of accurate indications is related to the significance of the Background [$R^2 = 0.035$, $F_{(1,125)} = 4.838$, $p < 0.05$], as well as to the nationality of a participant [$R^2 = 0.065$, $F_{(2,124)} = 4.279$, $p < 0.05$]

Regression slopes show that concentration on Background has a relationship with recognition accuracy. The more significant the Background is, the less accurate the indications, particularly among Chinese.

The mean of total number of errors is also related to the significance of the Background [$R^2 = 0.074$, $F_{(1,125)} = 10.013$, $p < 0.05$], as well as to the nationality of a participant [$R^2 = 0.112$, $F_{(2,124)} = 7.802$, $p < 0.01$].

Regression slopes also show that concentration on Background, particularly among the Chinese, has also a relationship with total number of errors. The more important is the photo-background, the more errors appear. When the significance of the Background is not so high, Chinese have even less errors than Polish participants. The significant interaction effect is: $F_{(3,123)} = 6.843$, $p < 0.001$.

DISCUSSION

The results obtained in this research indicate in the field of the perception and significance of the stimuli that Chinese are more sensitive to the Context and for the Europeans (Poles) the Figure/Object is more important.

The second set of findings dealing with the memory shows that, in contrary to the Nisbett's and Masuda's prototype of the research, Chinese make more errors than Poles in memory test. It can be explained in order to the more complicated cognitive circumstances than in the prototype, but also according to other data that show that Chinese are used to collect more information and are not so eager to reject any of them (Nisbett, 2003).

We have to admit that data dealing with perception and evaluation of Object and Background are more conclusive in their clarity that those referring to Recognition Test. The frequency of errors referring to different kinds of stimulus (Background/Object) has

not been checked. In further research the memory of the Object and memory of the Context should be separated and controlled.

Although some limitations, we can summarize that it is not definitely like Masuda and Nisbett suggested that the holistic perception brings Asians only some advantages, because they see more details which let them see far more of the world than Westerners. Unfortunately they are also in cognitively more demanding situation and they have to remember more elements. Perception of relations and remembering all the connections between elements is helpful in a circumstances of original and novel stimulus, but when the person have to deal with similar stimulus it is more useful to concentrate only on some features, like the Object. Depending on the situation, both holistic and analytic of cognitive styles can be useful and appropriate.

Closing, I just would like to make more general comment on that what has been often said, that in the XXth century Asian and Western civilizations came much closer than ever before and therefore they became very similar (Gawlikowski, 2002). It is important to mention that it can refer only to some degree, to be honest, only to the very little degree. The fundamental conceptions about cosmos, society or individuals are steel very different. They shape mentalities, social structures and values which are not the same and are characteristic for each culture. Those differences between civilizations can be found in philosophical conceptions, but also in more empirical data, such as those presented in Nisbett's and his colleagues works and in that article, which refer to perception, thinking and memory.

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