

I. Vocabulary: Choose the answer that best matches the meaning of each bold word or phrase (20%)

1. Fungal spores, lighter and smaller than all plant seeds, are mainly **dispersed** from their parent by wind.
A. spread widely B. delivered C. made more stable D. collected
2. The **devastating** earthquake and tsunami in Fukushima ruined most of the buildings there and killed thousands of lives.
A. foreboding B. damaging and harmful C. bitter D. intimidating
3. The philosophy of Barack Obama's foreign policy has been **postulated** as "The Obama Doctrine" for the principles it advocates.
A. disputed B. dismissed C. assumed D. scorned
4. Debates have been stirred on whether inmates should become the **integral** part of the social workforce.
A. constituent B. honest C. extrinsic D. outward
5. A mistake that was **inadvertently** made by the clerk has cost him his job.
A. intentionally B. deliberately C. carefully D. accidentally
6. It is **mandatory** that all students, regardless of degree program, take at least five core courses offered by the university.
A. compulsory B. optional C. elective D. voluntarily
7. The Bumrungrad Hospital, one of the leading international hospitals in the world, is known for treating patients with **state-of-the-art** technology.
A. very expensive B. the most advanced C. fashionable D. national treasure
8. Clinicians argue that **rigorous** scientific research is not necessary on alternative medicine, but researchers think otherwise.
A. powerful and forceful B. scrupulously accurate C. lenient D. strenuous
9. Under **optimal** temperature and growth conditions, certain bacteria can have a generation of 15-20 minutes.
A. unfavorable B. adverse C. ideal D. disagreeable
10. The word "Linsanity" is now in most NBA fan's **vernacular** as a result of Jeremy Lin's stunning breakout performance in these past few weeks.
A. collection B. everyday language C. souvenir D. password

II. Sentence Completion: Choose the word that best completes the sentence (10%)

11. Mary is _____ and would never want to be closed in a small room or space.
A. xenophobic B. homophobic C. acrophobic D. claustrophobic
12. Studies show that _____ children are at high risk for a number of conditions, including overweight, high blood pressure and high cholesterol.
A. slim B. anorexic C. obese D. malnourished
13. The ways web-based social media impact our lives are rather different from the ways traditional media do, the most notable being that social media allow communication to become more _____.
A. interactive B. hyperactive C. stagnant D. torpid
14. According to the International Labor Organization, the recent economic decline is likely to increase the unemployment rate for women as well as to make gender _____ in economic policies more visible.
A. equality B. discrepancy C. disparity D. similarity
15. Children with disabilities are discriminated against and treated as burden mainly due to _____ understanding by society and a lack of social supports.
A. sufficient B. ample C. disinterested D. inadequate

III. Written Expression: Identify the underlined word or phrase that must be changed in order for the sentence to be correct (14%)

16. My (A) strong experience, (B) good training, and (C) am a hard worker (D) qualify me for this position.
17. In (A) recent years, some educators argue that it is better for undergraduate students (B) to focus on only one or two subjects than to study a (C) diversified range of different (D) subject.
18. The furniture and refrigerator were (A) delivered (B) promptly to my home, but they were not the style I (C) ordered, and the (D) price was not right either.

19. The saltwater (A) crocodile, the largest of all living (B) reptiles, can travel long (C) distances at sea and is capable of killing any animal that (D) enter its territory.
20. If you are (A) assigned a specific topic for a research paper, you can begin (B) by going to the library to look for (C) informations that (D) is relevant to the topic.
21. According to scientists, if a woman's waist is 70 percent as wide as her (A) hips, she (B) viewed as attractive by most men because the evolution of the brain (C) associates this body figure (D) with fertility.
22. Even though some companies view bribery (A) as illegal, (B) other tolerate it because it is a good way to speed up the (C) completion of a deal and (D) prevent harassment.

IV. Cloze Test: Choose the best answer for each missing word or phrase in the following passages (20%)

On the day of Taiwan's presidential election, hundreds of millions of ethnic Chinese worldwide watched the ballot count on TV and the Internet. Taiwan is the sole ethnic Chinese society (23) a second democratic turnover of power. Ethnic Chinese communities around the world (24) their hopes on this crucial political experiment. By succeeding, we can make unparalleled contributions to the democratic development of all ethnic Chinese communities. This responsibility is (25) to fulfill. The new administration's most urgent task is to lead Taiwan through the daunting challenges from globalization. The world economy (26) profoundly, and newly emerging countries are arising rapidly. We must upgrade Taiwan's international (27) and recover lost opportunities. The uncertainty of the current global economy poses as the main challenge to the revitalization of Taiwan's economy. Yet, we firmly believe that, with right policies and steadfast determination, our goals are (28) our grasp. (Source: President Ma's Inaugural Address in 2008)

23. A. to complete B. has completed C. completed D. to completing
24. A. laid B. is laying C. have laid D. will be laying
25. A. yours B. ours C. theirs D. them
26. A. change B. is changing C. had changed D. changed
27. A. competition B. competitiveness C. competitive D. competitor
28. A. beyond B. under C. next to D. within

The cinema offers a number of possible pleasures. One is scopophilia (a pleasure in looking). There are circumstances in which looking (29) is a source of pleasure, just as, in the reverse formation, there is pleasure in being looked at...[Freud] associated scopophilia with taking other people as objects, (30) them to a controlling and curious gaze... The camera satisfies a primordial wish (31) pleasurable looking, but it also goes further: developing scopophilia (32) its narcissistic aspect. (source: excerpt from "Visual Pleasure and Narrative Cinema" by Luara Mulvey)

29. A. itself B. at it C. forward to D. after
30. A. is subjecting B. subjecting C. subjects D. subjected
31. A. in B. at C. to D. for
32. A. in B. at C. to D. for

V. Reading Comprehension: Choose the best answers to the following questions (36%)

In a recent experiment, scientists asked a group of prescreened people to look at a set of gray patterns and try to visualize color. Eleven members of the group had been identified as highly susceptible to hypnosis while seven of the subjects were not susceptible. Hypnosis is a trance-like state characterized by heightened focus, concentration, and inner absorption, according to the Mayo Clinic. About 10 percent of people worldwide are highly susceptible to hypnosis while 10 percent are not influenced at all. The remaining 80 percent—the majority of the population—are moderately susceptible, said study co-author William McGeown, a neuroscientist at the U.K.'s Hull University. The new study found that all the subjects who were easily hypnotized reported seeing a range of colors even while not under hypnosis, McGeown said. The scientists didn't just take their word for it—MRI scans showed that the parts of the subjects' brains linked to color perception lit up when they saw the imaginary hues. "We can see changes in these color-sensitive regions of their brains, which they have no way of faking," said McGeown, who published the study with colleagues in the December issue of the journal *Consciousness and Cognition*.

The new study also found that being under hypnosis enhanced color hallucination in susceptible subjects. But those who were not susceptible to hypnosis could not hallucinate color with or without hypnosis. Stephen Kosslyn, a psychologist at Stanford

University, said the results reinforce his team's earlier research. In 2000, Kosslyn and colleagues published one of the first studies on hallucinating color. Their experiment asked highly susceptible people under hypnosis to imagine gray squares as being in color. That study, which used PET scans of the subjects' brains, also found that the subjects activated parts of their brains associated with color perception. The new study confirms a similar finding with MRI scans, which are more often favored in today's experiments because they provide better spatial resolution, co-author McGeown said.

Ultimately, the hallucination research may help medical professionals who use hypnosis to treat a range of conditions, from phobias to pain, McGeown noted. That's because, despite its medical use, many people are fearful of the procedure. The new research shows that suggestion can be almost as powerful a tool, which means there may be a less intimidating alternative for people fearful of hypnosis, he said. "Psychological therapies which consist of making suggestions to a patient—even in the absence of hypnosis—may help with their problem substantially."

(Source: "People Can Hallucinate Color at Will" by Christine Dell'Amore in *National Geographic News*, published December 7, 2011)

33. The word "susceptible" in this passage is closest in meaning to
- A. unresistant
 - B. invulnerable
 - C. unexposed
 - D. doubtful
34. Which of the following is NOT one of the characteristics of hypnosis?
- A. The subject is put into a sleeplike state
 - B. Hypnosis is a state of mental concentration
 - C. A hypnotized mind is judging and critiquing.
 - D. None of the above
35. Which of the following statements is NOT true?
- A. Subjects who are susceptible to hypnosis can hallucinate color.
 - B. Subjects who are unsusceptible to hypnosis can visualize color when being under hypnosis.
 - C. Only MRI scans were used in the experiment conducted by William McGeown and his partner.
 - D. The parts of the brain that respond to color perception are activated when the subjects are hallucinating color.
36. According to McGeown, the findings of hallucination research may be of help to people with
- A. irrational fear of a specific object or activity
 - B. migraine
 - C. fever
 - D. A and B only
37. Which of the following statements best summarizes the central idea of this article?
- A. Hypnosis can help people with their problems.
 - B. Some people are fearful of hypnosis
 - C. Only a portion of people are susceptible to hypnosis.
 - D. People can hallucinate color just with the power of suggestion.

"Green" has become a popular English phrase. It means that something is good for the environment. Customers are looking for products that are "natural," "pure," and "made from recycled materials." They feel good about helping the Earth and about buying food and cosmetics that are healthier for their bodies. Anita Roddick sensed this when she founded The Body Shop in 1976. She advertised cosmetics that were "100 percent pure" and boasted that The Body Shop's products were not tested on animals. Also, she said The Body Shop did not take unfair advantage of the workers in poor countries.

For some people, this sounded too good to be true. In 1994, reporter Jon Entine wrote a famous magazine article disputing Roddick's claims. He said that The Body Shop cosmetics were actually only one percent pure. Entine also pointed out that most of the ingredients in The Body Shop's product were, indeed, tested on animals. This prompted Roddick to change the phrase on her cosmetics labels. Instead of "not tested on animals," it became "against animal testing." Later, other critics joined in. The London chapter of Greenpeace accused The Body Shop of exploiting poor workers.

Today many other "green" companies face similar criticism. Are products marketed as "green" really good for environment, or

do producers simply claim that they are so they can make more money? It's a tough question. Thanks to writers such as Entine, however, one thing is certain: They are less likely to trust the manufacturer's word.

(Source: "The Green Myth" in *Reading for the Real World*, Campus Publishing, 2009)

38. According to the passage, the word "green" has become associated with products
- A. that are not greasy and look fresh
 - B. that are friendly to the environment
 - C. that can be easily absorbed by the body
 - D. All of the above
39. Which of the following claims of The Body Shop was NOT disputed by Jon Entine?
- A. The Body Shop cosmetics did not exploit workers in poor countries.
 - B. The Body Shop cosmetics were not tested on animals.
 - C. The Body Shop cosmetics were 100% pure.
 - D. None of the above
40. Which of the following statements best summarizes the main idea of the article?
- A. Customers should never trust the manufacturers because they are dishonest.
 - B. Green advertising claims could be misleading.
 - C. "Green" is a good marketing strategy to sell products.
 - D. False advertising should be punished.
41. Which of the following statement would the writer of this passage probably agree with?
- A. We should stop buying "green" products because none of them is really "green."
 - B. Anita Roddick has abused the trust of her customers.
 - C. Writers such as Jon Entine work to ruin manufactures' reputation.
 - D. All products are bad for environment.

About a year ago I was diagnosed with cancer. I had a scan at 7:30 in the morning, and it clearly showed a tumor on my pancreas. I didn't even know what a pancreas was. The doctors told me this was almost certainly a type of cancer that is incurable, and that I should expect to live no longer than three to six months. My doctor advised me to go home and get my affairs in order, which is doctor's code for prepare to die. It means to try to tell your kids everything you thought you'd have the next 10 years to tell them in just a few months. It means to make sure everything is buttoned up so that it will be as easy as possible for your family. It means to say your goodbyes. I lived with that diagnosis all day. Later that evening I had a biopsy, where they stuck an endoscope down my throat, through my stomach and into my intestines, put a needle into my pancreas and got a few cells from the tumor. I was sedated, but my wife, who was there, told me that when they viewed the cells under a microscope the doctors started crying because it turned out to be a very rare form of pancreatic cancer that is curable with surgery. I had the surgery and I'm fine now.

This was the closest I've been to facing death, and I hope it's the closest I get for a few more decades. Having lived through it, I can now say this to you with a bit more certainty than when death was a useful but purely intellectual concept:

Your time is limited, so don't waste it living someone else's life. Don't be trapped by dogma — which is living with the results of other people's thinking. Don't let the noise of others' opinions drown out your own inner voice. And most important, have the courage to follow your heart and intuition. They somehow already know what you truly want to become. Everything else is secondary.

When I was young, there was an amazing publication called *The Whole Earth Catalog*, which was one of the bibles of my generation. It was created by a fellow named Stewart Brand not far from here in Menlo Park, and he brought it to life with his poetic touch. This was in the late 1960's, before personal computers and desktop publishing, so it was all made with typewriters, scissors, and polaroid cameras. It was sort of like Google in paperback form, 35 years before Google came along: it was idealistic, and overflowing with neat tools and great notions.

Stewart and his team put out several issues of *The Whole Earth Catalog*, and then when it had run its course, they put out a final issue. It was the mid-1970s, and I was your age. On the back cover of their final issue was a photograph of an early morning country road, the kind you might find yourself hitchhiking on if you were so adventurous. Beneath it were the words:

"Stay Hungry. Stay Foolish." It was their farewell message as they signed off. Stay Hungry. Stay Foolish. And I have always wished that for myself. And now, as you graduate to begin anew, I wish that for you.

Stay Hungry. Stay Foolish.

(Source: Stanford commencement address delivered by **Steve Jobs** on June 12, 2005)

42. Which of the following statements is/are true about Steve Jobs?
- A. He did not seem to be familiar with some body organs before his illness.
 - B. He was told that he would be dead in less than a year.
 - C. The tumor he got could be removed with surgery
 - D. All of the above
43. The phrase "buttoned up" is closest in meaning to
- A. kept silence
 - B. finished
 - C. loosened up
 - D. tied down
44. Why did Steve Jobs' doctors react so strongly to the fact that Jobs' cancer was actually curable?
- A. They were upset over the misdiagnosis they had made.
 - B. They were worried that Job would sue them for medical malpractice.
 - C. They were surprised that they could keep their patient alive.
 - D. None of the above
45. In his speech, what advice did Jobs give to Stanford students?
- A. Do not try to live up to others' expectation
 - B. Do not let other people speak louder than you do
 - C. Always put yourself in others' shoes
 - D. It is a waste of time to live with others
46. What did Jobs probably mean by "Stay Hungry. Stay Foolish"?
- A. He meant that it is good to eat less and study less.
 - B. He meant that it is important to always have the curiosity for knowledge.
 - C. He meant that without enough food one can never be smart.
 - D. He meant that it is foolish to stay hungry.

Tonight is a particular honor for me because, let's face it, my presence on this stage is pretty unlikely.

My father was a foreign student, born and raised in a small village in Kenya. He grew up herding goats, went to school in a tin-roof shack. His father, my grandfather, was a cook, a domestic servant to the British. But my grandfather had larger dreams for his son. Through hard work and perseverance my father got a scholarship to study in a magical place, America, that's shown as a beacon of freedom and opportunity to so many who had come before him. While studying here my father met my mother. She was born in a town on the other side of the world, in Kansas.

My parents shared not only an improbable love; they shared an abiding faith in the possibilities of this nation. They would give me an African name, Barack, or "blessed," believing that in a tolerant America, your name is no barrier to success. They imagined me going to the best schools in the land, even though they weren't rich, because in a generous America you don't have to be rich to achieve your potential.

They're both passed away now. And yet I know that, on this night, they look down on me with great pride. And I stand here today grateful for the diversity of my heritage, aware that my parents' dreams live on in my two precious daughters. I stand here knowing that my story is part of the larger American story, that I owe a debt to all of those who came before me, and that in no other country on Earth is my story even possible.

Tonight, we gather to affirm the greatness of our nation not because of the height of our skyscrapers, or the power of our military, or the size of our economy; our pride is based on a very simple premise, summed up in a declaration made over two hundred years ago: "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain inalienable rights, that among these are life, liberty and the pursuit of happiness."

That is the true genius of America, a faith in simple dreams, an insistence on small miracles; that we can tuck in our children at night and know that they are fed and clothed and safe from harm; that we can say what we think, write what we think, without hearing a sudden knock on the door; that we can have an idea and start our own business without paying a bribe; that we can participate in the political process without fear of retribution; and that our votes will be counted -- or at least, most of the time.

And fellow Americans, Democrats, Republicans, independents, I say to you, tonight, we have more work to do..... more work to do, for the workers I met in Galesburg, Illinois, who are losing their union jobs at the Maytag plant that's moving to Mexico, and now they're having to compete with their own children for jobs that pay 7 bucks an hour; more to do for the father I met who was losing his job and choking back the tears wondering how he would pay \$4,500 a month for the drugs his son needs without the health benefits that he counted on; more to do for the young woman in East St. Louis, and thousands more like her who have the grades, have the drive, have the will, but don't have the money to go to college.

People don't expect -- people don't expect government to solve all their problems. But they sense, deep in their bones, that with just a slight change in priorities, we can make sure that every child in America has a decent shot at life and that the doors of opportunity remain open to all.

(Source: Excerpt from **Barack Obama's** Democratic Convention Speech delivered on July 27, 2004)

47. Which of the following is/are mentioned in Obama's speech?

- A. Interracial heritage
- B. Education
- C. Opportunity
- D. All of the above

48. Obama's parents thought their son's African name would not hinder his success because

- A. they believed he could go to the best school.
- B. America is a racially tolerant country
- C. Obama is blessed by his name
- D. one of his parents was born in America

49. Which of the following statements would Obama probably have faith in?

- A. All men are created equal
- B. One does not have to be rich to achieve one's dream in America
- C. There is no poverty in America
- D. A and B only
- E. B and C only

50. What are some of the social causes that Obama would most probably support according to the passage?

- A. Encouraging interracial marriage
- B. Offering financial aids to low income students
- C. Lowering the unemployment rate
- D. A and B only
- E. B and C only

一、請仔細閱讀下列個案，依優先順序列出問題、設定介入目標、期程、設計介入方法，並訂定成效指標。40分

「個案頭髮雜亂，神情憔悴，但意識清醒，心智功能完好。上下排牙齒因長期抽菸卡有許多污垢、泛黃；皮膚粗糙乾燥(案女表示案主鮮少注重個人衛生習慣，且因疾病關係而甚少盥洗)，下肢肢體乏力，且右足背及小腿蜂窩性組織炎仍腫脹，泛紅，現未服藥控制。如需下床如廁則需使用助行器輔助行走，但需有人扶持；現因腎衰竭而少尿，大便習慣改變(約三、四天一次，必要時需使用塞劑幫助排便)。案主訴他已經是個沒希望的人，不要再去限制他僅有的生活樂趣(例如：抽菸，吃飯)。個案34年出生，高中畢業，原職業為木工師傅，因車禍造成左手前臂及上臂骨折，因手部關節活動受限無法工作，爾後便以炒作股票當為正職。

九十七年初有過中風(左側肢體乏力)、糖尿病(十年-現用中效型胰島素控制血糖)併有腎衰竭(96年9月開始洗腎，在診所洗腎約十個月-每星期一、三、五晚上洗腎，右上肢裝有洗腎動靜脈瘻管，曾阻塞過，96年12月在XX醫院通過一次血管)、及慢性阻塞性肺部疾病(未服藥控制，抽菸多年、一天一包)，九十七年二月因右下肢傷口感染造成瀰漫性蜂窩性組織炎，在醫院住院治療。左上肢：肌力-較差；關節活動度-正常；右上肢：肌力-正常；關節活動度-正常；左下肢：肌力-較差；關節活動度-較差；右下肢：肌力-較差；關節活動度-較差。左手握力：較差；右手握力：較差。身高175公分、體重約80公斤，BMI：26.1，無假牙，採一般飲食；近三個月內無食慾下降或體重減輕的問題，雖可下床活動但需使用步行輔助器，並且須有一人在旁扶持。雖營養評估量表總分為十二分，看似無營養不良之現象，但由七月十四日一天的飲食量中顯示出對於糖尿病及腎臟病飲食知識缺失。

日常生活功能

- (1) 進食-可在合理的時間自行取食眼前食物，並吃完一餐(10分)。
- (2) 移位-坐起及移位過程中需些微協助(10分)。
- (3) 如廁-需協助保持平衡及擦拭後之清潔(5分)。
- (4) 洗澡-需別人協助才能完成盆浴或淋浴(0分)。
- (5) 平地走動-走時需大量扶持(0分)。
- (6) 穿脫衣褲鞋襪-在別人幫忙下，可自行完成一半以上動作(5分)。
- (7) 個人衛生-刷牙、洗臉、洗手、梳頭髮、刮鬍子協助才能完成(0分)。
- (8) 上下樓梯-無法上下樓梯(0分)。
- (9) 大便控制-使用塞劑(軟便劑)時需人幫忙(5分)。
- (10) 小便控制-會自行使用尿壺(10分)。

基本日常生活活動能力總分45分，失能項數共五項。

(四) 自我照顧

- (1) 上街購物-上街購物都需要有人陪。
- (2) 外出活動-當有人陪同可搭計程車或大眾運輸工具。
- (3) 食物烹調-需要別人把飯菜煮、擺好。
- (4) 家務維持-完全不會做家事。
- (5) 洗衣服-完全依賴他人。
- (6) 使用電話的能力-獨立使用電話，含查電話簿、撥號。
- (7) 服用藥物-需要少許協助(因視力模糊無法抽藥-抽藥劑量不準確)。
- (8) 處理財務能力-可以獨立處理財務。

工具性日常生活活動有五項需協助。

主要照顧者為案妻，今年56歲，無特殊身心障礙及疾病，每日至田裡工作約4-5個小時；照顧個案已兩年；自認為最需協助個案的地方為膳食準備、陪伴及盥洗。個案現居家中，僅與案妻同住。」

二、(A)比較職能治療中，醫療模式(medical model)與以職能為基礎的模式(occupation-based model)兩者異同。15分

(B)以自己熟悉的個案為例，分別陳述以醫療模式和以職能為基礎的模式介入時，設定目標、操作方式與成效指標各為何？請先簡述舉例的個案狀況。25分

三、簡介何為美國職能治療學會訂定的 Occupational therapy practice framework、何為 International classification of functioning, disability and health? 兩者有何關聯? 20分

請仔細閱讀下面這篇期刊，再回答所列出的問題

題目：The relationship between visual-perception and attention in Chinese with schizophrenia

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Patients with schizophrenia exhibit pervasive neuropsychological deficits, in which impairment in visual-perceptual function is common. Visual-perceptual function is a broad concept including spatial function (perception, estimation and orientation), visual function (construction, organization and recognition), closure and color estimation and discrimination. Such impairments could have considerable negative impacts on schizophrenic patients' general cognitive functioning because intact visual-perceptual function is the foundation of normal processing and organization of the enormous inputs from the visual world. Furthermore, visual-perceptual organization is a prerequisite for rapidly accessing semantic memory. Dysfunction of the ability to generate representations of segmented visual information could lead to reduced integration of visual stimuli with relevant stored memory.

To understand the nature of visual-perceptual function as experienced by people with schizophrenia, knowledge of perceptual organization and attention, and their interrelations is needed. Deficits in attention have been identified as core deficits of schizophrenia since Kraepelin in 1919. Recent studies have suggested that there are several distinct components of attention. Four commonly identified components are sustained attention, selective attention, switching attention and attentional control processing.

This study sought to verify if people with schizophrenia showed visual-perceptual difficulty. Furthermore, despite the well-established findings showing impairments in attention and perceptual organization among patients with schizophrenia, there is a paucity of research devoted to understand the interrelationship between attention and visual-perceptual organization. We therefore speculated that visual organization, and spatial perception and orientation of people with schizophrenia would be predicted by different components of attention, namely sustained attention, selective attention, switching attention and attentional control processing.

1. Methods

1.1. Participants

A total of 94 individuals participated in the present study: 47 belonged to the clinical group and 47 to the normal control group. All the participants gave their written informed consent prior to participation. The demographic and clinical characteristics of the clinical and normal populations are presented in Table 1.

Table 1. Demographic and clinical characteristics of patients with schizophrenia and normal controls

Variable	Patients (n=47)		Controls (n=47)		F	p
	M	S.D.	M	S.D.		
Nonverbal IQ (TONI-3)	22.77	5.90	30.06	3.25	55.167	<0.001
Years of education	11.24	3.24	11.19	2.36	0.123	0.726
Age (years)	37.83	9.36	62.85	9.62	163.35	<0.001
BDI	5.66	3.13	1.43	0.95	78.77	<0.001
Age of onset (years)	28.74	8.40	NA			
Illness duration	9.01	7.68	NA			

Variable	Patients (n=47)		Controls (n=47)		F	p
	M	S.D.	M	S.D.		
SAPS	4.47	5.90	NA			
SANS	7.11	8.04	NA			
No. of admissions	1.85	1.38	NA			

TONI-3=Test of Nonverbal Intelligence-3, BDI=Beck Depression Inventory, NA=not applicable, SAPS=Scale for Assessment of Positive Symptoms, SANS=Scale for Assessment of Negative Symptoms.

The two groups were matched in terms of gender composition (21 men and 26 women in each group, $\chi^2(df=1)$, $p<0.01$, ns). However, we could not match the two groups in both the dimensions of age and education. When we matched in terms of education [$F(1,92)=0.12$, $p=0.73$], the two groups were different in terms of age [$F(1,92)=163.35$, $p<0.01$]. The normal controls would be of a much higher level of education if they were matched to the clinical population in terms of age. Given that both age and education bear a strong relationship to intellectual ability, in order not to confound our findings due to the inclusion of too many variables, we decided to use the scores in the Test of Nonverbal Intelligence-3 (TONI-3) for the two groups [$F(1,92)=55.17$, $p<0.01$], which estimates nonverbal intellectual ability, in further data analysis in this study. As depression has a significant impact on cognitive function, we used the Beck Depression Inventory-II (BDI) to ascertain the degree of depression felt by our participants. The two groups had significantly different scores in the BDI [$F(1,92)=78.770$, $p<0.01$].

1.1.1. Clinical group

Forty-seven schizophrenic patients with well-regulated symptoms were recruited from an outpatient clinic in a public hospital in Hong Kong. These schizophrenic patients underwent a clinical interview as part of a comprehensive medical screening by an experienced mental health professional. The patients had to meet the Diagnostic and Statistical Manual of Mental Disorders-IV Test Revised (DSM-IV-TR) criteria for schizophrenia in order to be included. Patients with organic brain disorder, a history of severe head trauma, or a significant history of drug abuse or alcoholism were excluded from the study.

The mean duration of illness was 9.01 (S.D.=7.68) years and the average age of onset of illness was 28.74 (S.D.=8.40) years. The mean number of hospitalizations was 1.85 (S.D.=1.38). The severity of the clinical syndrome at the time of examination was assessed using the Scale for Assessment of Negative Symptoms (SANS) and the Scale for Assessment of Positive Symptoms (SAPS). All the patients were on antipsychotic medication at the time of the study. We did not control for patient medication because those patients who agreed to be withdrawn from their medication were not representative of the clinical population being studied. Though visual-perceptual function among patients with schizophrenia seems to be responsive to drug treatment, Killan et al. (1984) concluded in their study that psychotropic medication and the regime of its administration did not affect performance in cognitive and perceptual tests for schizophrenic patients in any specific manner. Joobar et al. (2002) studied the neuropsychological profile of patients with schizophrenia. Neuroleptic responder and neuroleptic-nonresponder patients, representing the two extremes of the neuroleptic response spectrum, were examined and compared with healthy controls. Although they performed significantly below the level of the normal subjects, the two groups did not differ from each other in terms of visual-spatial ability.

1.1.2. Normal control group

Forty-seven controls engaged in full-time employment, matched for education level (in years), were recruited. Controls with a previous history of psychiatric illness, or drug or alcohol dependence were excluded. All the participants were administered the Test of Nonverbal Intelligence to assess their current intellectual functioning, and the BDI to detect signs and symptoms of depression.

1.2. Instruments

All the participants completed a comprehensive battery of neuropsychological tests selected to assess intelligence, selective attention, sustained attention, auditory attention span, switching attention, the attention control process, visual-perceptual organization ability and visual-spatial perception ability. The tests were administered and scored by trained research assistants who were undergraduate students majoring in psychology or psychology graduates. The battery of tests was administered within 7 days of rating the symptoms.

1.2.1. Digit Vigilance Test (DVT; Lewis and Kupke, 1977)

The DVT, which is a subtest of the Lafayette Clinic Repeatable Cognitive Perceptual-Motor Battery, was used to assess sustained attention.

1.2.2. Stroop Test (Stroop, 1935)

The Stroop Test has been a common measure of selective attention (e.g. Amador et al., 1998). A previously validated Chinese translation of the Victoria Version of this test was used in the present study (Lee and Chan, 2000).

1.2.3. Symbol Digit Modalities Test (SDMT; Smith, 1982)

SDMT is a measure of switching attention. Following the standard administration procedure, both the written and the oral formats of the test were administered (Brouwer and Zomeran, 1994; Lezak, 1995). However, only the score of the oral format was used as a measure of the switching attention in the present study. This decision was based on the findings of Ponsford and Kinsella (1992) which suggested that the oral format of the SDMT was a better measure for switching attention.

1.2.4. Color Trails Test (CTT; D'Elia and Satz, 1989)

The CTT is an analogue of the Trials Making Test (TMT) from the Halstead-Reitan Battery in which letters from the English alphabet are substituted with colors (Cohen, 1993; D'Elia et al., 1996). Attentional control processing was assessed by the CTT (D'Elia et al., 1996).

1.2.5. Judgment of Line Orientation Test (JLOT; Benton et al., 1983)

The JLOT was used as a test of spatial perception and orientation. It consists of 5 practice and 30 test items. Each item comprises a pair of lines printed on one page. The subject is required to match the spatial orientation of these pair of lines with the corresponding ones from an array of lines shown on the previous page.

1.2.6. Hooper Visual Organization Test (HVOT; Hooper, 1983)

The HVOT, on the other hand, was used as a test of visual-perceptual organization. It consists of 30 drawings of common objects cut into several parts randomly displayed. The subject is required to conceptually rearrange the parts and name the objects.

1.3. Procedure

Each subject was administered the tests in a standardized order, on a one-on-one basis. Sustained attention was measured at the beginning of the testing. Testing was limited to 1 h and was conducted in a quiet room provided by the hospital.

1.4. Statistical analysis

The hypothesis of group difference in visual-perceptual function was tested by the analysis of covariance (ANCOVA), with visual-perceptual measurements as dependent variables and the scores in the TONI-3 and the BDI as the covariates. The hypothesis of the differential pattern of relationships between the different components of attention and visual-perceptual function was examined by multiple regression. All statistical tests were carried out using the Statistical Package for the Social Sciences (SPSS). The level of significance was set at $\alpha=0.05$.

2. Results

The scores of the schizophrenic patients and the healthy controls in the neuropsychological tests are displayed in Table 2.

Table 2. Comparisons of neuropsychological test scores among patients with schizophrenia and healthy controls

Measures	Patients (<i>n</i> =47)		Controls (<i>n</i> =47)	
	<i>M</i>	<i>S.D.</i>	<i>M</i>	<i>S.D.</i>
DVT-Total Time	499.30	208.98	309.49	12.50
Stroop Test (I)	14.89	8.87	5.28	0.91
CTT (I)	58.28	45.93	36.58	7.30
SDMT-Oral	47.53	12.82	66.70	2.79
HVOT	19.30	4.74	22.68	1.51
JLOT	17.81	6.36	26.79	1.23

DST=Digit Span Test (Forward), SDMT=Symbol Digit Modality Test, Stroop Test (I)=Interference score, CTT (I)=Color Trails Test Interference Score, DVT=Digit Vigilance Test, HVOT=Hooper Visual Organization Test, JLOT=Judgment of Line Orientation Test.

To test hypothesis 1, that people with schizophrenia would show visual-perceptual difficulty, ANCOVA tests were conducted to determine the between group differences in the HVOT and the JLOT, with the scores in the TONI-3 and the BDI as covariates. The results indicated significant group differences in the HVOT [$F(1,90)=6.13$, $p=0.015$] and the JLOT [$F(1,90)=29.865$, $p<0.01$]. These findings supported our speculation that people with schizophrenia did suffer from visual-perceptual deficits as measured by the HVOT and the JLOT. The score in the TONI-3, though not in the BDI, was a significant covariate ($p=0.001$ and <0.001 for the HVOT and the JLOT, respectively), implying that ability measured by the TONI-3 has a significant influence on the performance in both the HVOT and the JLOT.

To test hypothesis 2, that different components of attention, namely sustained attention, selective attention, switching attention and attentional control processing, would relate to the visual-perceptual function of people with schizophrenia differently, step-wise multiple linear regression procedures were employed. The scores in the HVOT and the JLOT were used as the criterion variables. Table 3 and Table 4 provide a summary of these results.

Table 3. Summary of stepwise regression analysis for variables predicting the HVOT

Predictors	<i>B</i>	<i>S.E.</i>	β	<i>R</i> ²
Constant	11.454	2.428		
SDMT-Oral	0.165**	0.049	0.446	0.199
Excluded variables				
DVT-Total Time			0.263	
Stroop Test (I)			-0.115	
CTT (I)			-0.040	

** $p<0.01$

Table 4. Summary of stepwise regression analysis for variables predicting the JLOT

Predictors	<i>B</i>	S.E.	β	<i>R</i> ²
Constant	7.80	3.474		
CTT (I)	-6.017E-02**	0.019	-0.434	0.189
Excluded variables				
DVT-Total Time			-0.129	
Stroop Test (I)			0.100	
SDMT-Oral			0.222	

** $p < 0.01$.

Four variables, including the scores in the DVT (total time), the Stroop Test (interference score), the SDMT (oral version) and the CTT (interference score), were entered as predictor variables using the stepwise method. Among the normal controls, none of the four variables significantly predicted the performance in the HVOT or the JLOT ($p > 0.05$). However, consistent with our speculation, different components of attention related to the performance in the HVOT and the JLOT of our clinical participants. For the HVOT, only the SDMT (oral version) significantly predicted its score ($p = 0.002$), which explained 19.9% of the variance of the score in the HVOT. The other variables were not significant predictors ($p > 0.05$). For the JLOT, the CTT (interference score) was the only significant predictor of performance ($p = 0.002$), explaining 18.9% of the variance of the score in the JLOT.

3. Discussion

This study examined visual-perceptual function of people with schizophrenia and how different components of attention related to it. The findings indicated that people with schizophrenia did suffer from visual-perceptual deficits in the areas of visual-perceptual organization (measured by the HVOT), and spatial-perceptual organization and orientation (measured by the JLOT). We also observed that different components of attention related to the visual-spatial function of people with schizophrenia differently. Attentional control processing, measured by the CTT, turned out to be the best predictor of performance in the HVOT, while switching attention, measured by the SDMT, was the best predictor of performance in the JLOT. A relationship between attention and visual-perceptual function was not observed for our normal controls.

3.1. Visual-perceptual function

Our findings are consistent with those of previous studies. Using a task of reporting displayed lines, Place and Gilmore (1980) demonstrated that perceptual deficits in schizophrenic patients were due to a failure to organize information at an early stage of visual processing. Wells and Leventhal (1984) replicated the study with several methodological refinements, and confirmed the findings.

However, our findings contradict those of other reports. Faustman et al. (2001) evaluated the basic perceptual and visual processes in patients with schizophrenia and observed that most of the patients showed a normal range of performance in neuropsychological tests including the Right-Left Orientation Test, the JLOT and the Visual Form Discrimination Test. Also, Riley et al. (2000) found that there were no significant differences in performance in the JLOT between patients with first-episode psychosis and controls in terms of visual-spatial perception.

The discrepancy in the findings could be explained by methodological heterogeneity across studies. In our study, we included only chronic patients diagnosed with schizophrenia, whereas in some other studies, a broader spectrum of clinical participants may have been recruited (e.g. Riley et al., 2000). The degree of chronicity of the clinical participants may also affect the findings regarding the visual-perceptual function of patients with schizophrenia. For example, Riley et al. (2000) used patients with first-episode psychosis, whereas our participants had reached a more chronic stage of their illness. Sweeney et al. (1991) conducted a longitudinal study on the stability of neuropsychological deficits in schizophrenic patients, and observed significant improvement in their scores in the JLOT after 1 year (Benton et al., 1983). The discrepancy in the symptom constellation of the participants may have contributed to the variation in the research findings. Faustman et al. (2001) suggest that negative symptoms may relate to visual-perceptual function, and that the differences in the sample combination could interfere with the findings regarding the visual-perceptual function of patients with schizophrenia.

Though the JLOT and the HVOT are commonly used in evaluating the visual-perceptual function of patients with schizophrenia, the batteries of tests adopted have varied slightly across studies. Some used block design and picture completion subtests of the Wechsler Scale (e.g. Jooper et al., 2002), while others used different measures of visual-perceptual function (e.g. Faustman et al., 2001). Cross-study comparisons would be more meaningful and powerful if researchers were to adopt a more unified experimental protocol.

3.2. Attention and visual-spatial function

Our findings are consistent with those of previous reports that attention and the visual-spatial function of people with schizophrenia are related. For example, Tek et al. (2002) evaluated the integrity of the perceptual system for object and spatial visual information, and the relevant working memory system after adjusting for individual perceptual performance differences. They concluded that the systems governing object and spatial visual perception, and working memory appeared to be affected differently by schizophrenia.

We observed that the attention control process is a significant predictor of visual-perceptual organization measured by the HVOT. We therefore speculated that an inability to focus on relevant stimuli and disregard irrelevant stimuli may overload the limited amount of processing capacity available (Kahneman, 1973). Furthermore, impairments in the activation and allocation of attention (Nestor et al., 1990) create further difficulty for the attention control process that may eventually affect visual-perceptual organization. On the other hand, switching attention measured by the SDMT predicts spatial perception and orientation measured by the JLOT. Considering the findings of Gold et al. (2002) that performance in the Digit-Symbol Test, a variant form of the SDMT, was also a significant predictor of functional outcomes, in terms of length of job tenure, it further suggests that spatial perception and orientation may bear an impact on the level of functioning of people with schizophrenia in the real world.

Given the fact that both attentional tasks, namely the CTT and the SDMT, predicting visual organization and orientation are timed tasks, could a generalized slowing of neurocognitive functions in people with schizophrenia limit the amount of relevant information that can be processed within a limited time frame and henceforth affect visual-perceptual functioning observed in people with schizophrenia? This speculation awaits verification in future research employing attentional paradigms that are not timed.

In summary, the findings of this study clearly indicate that visual-perceptual deficits do exist in patients with schizophrenia, which may extend beyond the domains measured in this study. Also, different attention components relate to the visual-spatial function among people with schizophrenia differently. The unique patterns of such relationships imply that different models are needed to describe specific domains of visual-spatial function and attention. Furthermore, future research efforts to understand the universality of the pattern of visual-spatial deficits across the different subgroups of schizophrenia will provide theoretical refinement of the cognitive impact of schizophrenia.

問題

1. 請簡要敘述本文的 (1) 研究目的 (2) 研究方法 (3) 結果 (4) 結論。(40 分)
2. Results 的第二段第 1-2 行，請說明為何 ANCOVA 要以 TONI-3 與 BDI 作為共變項？(20 分)
3. 請指出 Discussion 第一段第 5-6 行的敘述 “Attentional control processing, measured by the CTT, turned out to be the best predictor of performance in the HVOT, while switching attention, measured by the SDMT, was the best predictor of performance in the JLOT.” 有何錯誤之處？(20 分)
4. 請說明本研究設計使用控制組的目的為何？(20 分)