Reading 5 HW

PASSAGE 1

EFFECTS OF NOISE

In general, it is plausible to suppose that we should prefer peace and quiet to noise. And yet most of us have had the experience of having to adjust to sleeping in the mountains or the countryside because it was initially 'too quiet', an experience that suggests that humans are capable of adapting to a wide range of noise levels. Research supports this view. For example, Glass and Singer (1972) exposed people to short bursts of very loud noise and then measured their ability to work out problems and their physiological reactions to the noise. The noise was quite disruptive at first, but after about four minutes the subjects were doing just as well on their tasks as control subjects who were not exposed to noise. Their physiological arousal also declined quickly to the same levels as those of the control subjects.

But there are limits to adaptation and loud noise becomes more troublesome if the person is required to concentrate on more than one task. For example, high noise levels interfered with the performance of subjects who were required to monitor three dials at a time, a task not unlike that of an aeroplane pilot or an air-traffic controller (Broadbent, 1957). Similarly, noise did not affect a subject's ability to track a moving line with a steering wheel, but it did interfere with the subject's ability to repeat numbers while tracking (Finkelman and Glass, 1970).

Probably the most significant finding from research on noise is that its predictability is more important than how loud it is. We are much more able to 'tune out' chronic background noise, even if it is quite loud, than to work under circumstances with unexpected intrusions of noise. In the Glass and Singer study, in which subjects were exposed to bursts of noise as they worked on a task, some subjects heard loud bursts and others heard soft bursts. For some subjects, the bursts were spaced exactly one minute apart (predictable noise); others heard the same amount of noise overall, but the bursts occurred at random intervals (unpredictable noise). Subjects reported finding the predictable and unpredictable noise equally annoying, and all subjects performed at about the same level during the noise portion of the experiment. But the different noise conditions had quite different after-effects when the subjects were required to proofread written material under conditions of no noise. As shown in Table 1 the unpredictable noise produced more errors in the later proofreading task than predictable noise; and soft, unpredictable noise actually produced slightly more errors on this task than the loud, predictable noise.

	Unpredictable Noise	Predictable Noise	Average
Loud noise	40.1	31.8	35.9
Soft noise	36.7	21.4	32.1
Average	38.4	29.6	

Table 1 : ***Proofreading Errors and Noise***

Apparently, unpredictable noise produces more fatigue than predictable noise, but it takes a while for this fatigue to take its toll on performance.

Predictability is not the only variable that reduces or eliminates the negative effects of noise. Another is control. If the individual knows that he or she can control the noise, this seems to eliminate both its negative effects at the time and its after-effects. This is true even if the individual never actually exercises his or her option to turn the noise off (Glass and Singer, 1972). Just the knowledge that one has control is sufficient.

The studies discussed so far exposed people to noise for only short periods and only transient effects were studied. But the major worry about noisy environments is that living day after day with chronic noise may produce serious, lasting effects. One study, suggesting that this worry is a realistic one, compared elementary school pupils who attended schools near Los Angeles's busiest airport with students who attended schools in quiet neighbourhoods (Cohen et al., 1980). It was found that children from the noisy schools had higher blood pressure and were more easily distracted than those who attended the quiet schools. Moreover, there was no evidence of adaptability to the noise. In fact, the longer the children had attended the noisy schools, the more distractible they became. The effects also seem to be long lasting. A follow-up study showed that children who were moved to less noisy classrooms still showed greater distractibility one year later than students who had always been in the quiet schools (Cohen et al, 1981). It should be noted that the two groups of children had been carefully matched by the investigators so that they were comparable in age, ethnicity, race, and social class.

Questions 1–3

Choose the correct letter, ***A, B, C*** *or* ***D****.*

1 The writer suggests that people may have difficulty sleeping in the mountains because

- **A** humans do not prefer peace and quiet to noise.
- **B** they may be exposed to short bursts of very strange sounds.
- **C** humans prefer to hear a certain amount of noise while they sleep.
- **D** they may have adapted to a higher noise level in the city.

2 In noise experiments, Glass and Singer found that

A problem-solving is much easier under quiet conditions.
B physiological arousal prevents the ability to work.
C bursts of noise do not seriously disrupt problem-solving in the long term.
D the physiological arousal of control subjects declined quickly.

3 Researchers discovered that high noise levels are not likely to interfere with the

A successful performance of a single task.
B tasks of pilots or air traffic controllers.
C ability to repeat numbers while tracking moving lines.
D ability to monitor three dials at once.

Questions 4–8

*Complete the summary using the list of words and phrases, **A–J**, below.*
NB *You may use any letter **MORE THAN ONCE**.*

A no control over
B unexpected
C intense
D the same amount of
E performed better than
F performed at about the same level as
G no
H showed more irritation than
I made more mistakes than
J different types of

Glass and Singer (1972) showed that situations in which there is intense noise have less effect on performance than circumstances in which **4** …………………… noise occurs.

Subjects were divided into groups to perform a task. Some heard loud bursts of noise, others soft. For some subjects, the noise was predictable, while for others its occurrence was random. All groups were exposed to **5** …………………… noise.

The predictable noise group **6** …………………… the unpredictable noise group on this task. In the second part of the experiment, the four groups were given a proofreading task to complete under conditions of no noise. They were required to check written material for errors. The group which had been exposed to unpredictable noise **7** …………………… the group which had been exposed to predictable noise. The group which had been exposed to loud predictable noise performed better than those who had heard soft, unpredictable bursts.

The results suggest that **8** …………………… noise produces fatigue but that this manifests itself later.

Questions 9–14

*Look at the following statements (Questions **9–14**) and the list of researchers below.*
*Match each statement with the correct researcher(s), **A–E**.*
NB *You may use any letter more than once.*

List of researchers	
A	Glass and Singer
B	Broadbent
C	Finkelman and Glass
D	Cohen et al.
E	None of the above

9 Subjects exposed to noise find it difficult at first to concentrate on problem-solving tasks.

10 Long-term exposure to noise can produce changes in behaviour which can still be observed a year later.

11 The problems associated with exposure to noise do not arise if the subject knows they can make it stop.

12 Exposure to high-pitched noise results in more errors than exposure to low-pitched noise.

13 Subjects find it difficult to perform three tasks at the same time when exposed to noise.

14 Noise affects a subject's capacity to repeat numbers while carrying out another task.

POST-TEST EXERCISE

1. Complete the keyword table.

Keyword in questions	Similar words in the passage
they may have adapted to a higher noise level in the city.	
bursts of noise **do not seriously disrupt** problem-solving **in the long term**.	
high noise levels **are not likely to interfere with** *the successful performance of …*	
intense noise *have* less *effect on performance* than circumstances in which **unexpected** noise occurs.	
All groups were exposed to **the same amount of** noise.	
unpredictable noise **made more mistakes**	
The results suggest that unexpected noise produces fatigue but that this ***manifests itself*** later.	
Subjects exposed to noise find it difficult at first	
changes in behaviour which can still be observed a year later	
if the subject knows they can **make it stop**	
Subjects find it difficult to perform three tasks at the same time **when exposed to noise.**	
Noise **affects** a subject's capacity to repeat numbers while carrying out another task.	

2. Translate the following words into English.

1. plausible (adj) ……………………………………
2. expose (v) ……………………………………
3. interfere (v) ……………………………………
4. adaptability (n) ……………………………………
5. distractible (adj) ……………………………………
6. predictability (n) ……………………………………
7. chronic (adj) ……………………………………
8. intrusion (n) ……………………………………
9. fatigue (n) ……………………………………
10. transient (adj) ……………………………………

PASSAGE 2

Why pagodas don't fall down

In a land swept by typhoons and shaken by earthquakes, how have Japan's tallest and seemingly flimsiest old buildings – 500 or so wooden pagodas – remained standing for centuries? Records show that only two have collapsed during the past 1400 years. Those that have disappeared were destroyed by fire as a result of lightning or civil war. The disastrous Hanshin earthquake in 1995 killed 6,400 people, toppled elevated highways, flattened office blocks and devastated the port area of Kobe. Yet it left the magnificent five-storey pagoda at the Toji temple in nearby Kyoto unscathed, though it levelled a number of buildings in the neighbourhood.

Japanese scholars have been mystified for ages about why these tall, slender buildings are so stable. It was only thirty years ago that the building industry felt confident enough to erect office blocks of steel and reinforced concrete that had more than a dozen floors. With its special shock absorbers to dampen the effect of sudden sideways movements from an earthquake, the thirty-six-storey Kasumigaseki building in central Tokyo – Japan's first skyscraper – was considered a masterpiece of modern engineering when it was built in 1968.

Yet in 826, with only pegs and wedges to keep his wooden structure upright, the master builder Kobodaishi had no hesitation in sending his majestic Toji pagoda soaring fifty-five metres into the sky – nearly half as high as the Kasumigaseki skyscraper built some eleven centuries later. Clearly, Japanese carpenters of the day knew a few tricks about allowing a building to sway and settle itself rather than fight nature's forces. But what sort of tricks?

The multi-storey pagoda came to Japan from China in the sixth century. As in China, they were first introduced with Buddhism and were attached to important temples. The Chinese built their pagodas in brick or stone, with inner staircases, and used them in later centuries mainly as watchtowers. When the pagoda reached Japan, however, its architecture was freely adapted to local conditions – they were built less high, typically five rather than nine storeys, made mainly of wood and the staircase was dispensed with because the Japanese pagoda did not have any practical use but became more of an art object. Because of the typhoons that batter Japan in the summer, Japanese builders learned to extend the eaves of buildings further beyond the walls. This prevents rainwater gushing down the walls. Pagodas in China and Korea have nothing like the overhang that is found on pagodas in Japan.

The roof of a Japanese temple building can be made to overhang the sides of the structure by fifty per cent or more of the building's overall width. For the same reason, the builders of Japanese pagodas seem to have further increased their weight by choosing to cover these extended eaves not with the porcelain tiles of many Chinese pagodas but with much heavier earthenware tiles.

But this does not totally explain the great resilience of Japanese pagodas. Is the answer that, like a tall pine tree, the Japanese pagoda – with its massive trunk-like central pillar known as shinbashira – simply flexes and sways during a typhoon or earthquake? For centuries, many thought so. But the answer is not so simple because the startling thing is that the shinbashira actually carries no load at all. In fact, in some pagoda designs, it does not even rest on the ground, but is suspended from the top of the pagoda – hanging loosely down through the middle of the building. The weight of the building is supported entirely by twelve outer and four inner columns.

And what is the role of the shinbashira, the central pillar? The best way to understand the shinbashira's role is to watch a video made by Shuzo Ishida, a structural engineer at Kyoto Institute of Technology. Mr Ishida, known to his students as 'Professor Pagoda' because of his passion to understand the pagoda, has built a series of models and tested them on a 'shake-table' in his laboratory. In short, the shinbashira was acting like an enormous stationary pendulum. The ancient craftsmen, apparently without the assistance of very advanced mathematics, seemed to grasp the principles that were, more than a thousand years later, applied in the construction of Japan's first skyscraper. What those early craftsmen had found by trial and error was that under pressure a pagoda's loose stack of floors could be made to slither to and fro independent of one another. Viewed from the side, the pagoda seemed to be doing a snake dance – with each consecutive floor moving in the opposite direction to its neighbours above and below. The shinbashira, running up through a hole in the centre of the building, constrained individual storeys from moving too far because, after moving a certain distance, they banged into it, transmitting energy away along the column.

Another strange feature of the Japanese pagoda is that, because the building tapers, with each successive floor plan being smaller than the one below, none of the vertical pillars that carry the weight of the building is connected to its corresponding pillar above. In other words, a five-storey pagoda contains not even one pillar that travels right up through the building to carry the structural loads from the top to the bottom. More surprising is the fact that the individual storeys of a Japanese pagoda, unlike their counterparts elsewhere, are not actually connected to each other. They are simply stacked one on top of another like a pile of hats. Interestingly, such a design would not be permitted under current Japanese building regulations.

And the extra-wide eaves? Think of them as a tightrope walker's balancing pole. The bigger the mass at each end of the pole, the easier it is for the tightrope walker to maintain his or her balance. The same holds true for a pagoda. 'With the eaves extending out on all sides like balancing poles,' says Mr Ishida, 'the building responds to even the most powerful jolt of an earthquake with a graceful swaying, never an abrupt shaking.' Here again, Japanese master builders of a thousand years ago anticipated concepts of modern structural engineering.

Questions 1–4

*Are the following statements **YES**, **NO**, or **NOT GIVEN**?*

1 Only two Japanese pagodas have collapsed in 1400 years.
2 The Hanshin earthquake of 1995 destroyed the pagoda at the Toji temple.
3 The other buildings near the Toji pagoda had been built in the last 30 years.
4 The builders of pagodas knew how to absorb some of the power produced by severe weather conditions.

Questions 5–10

*Classify the following, **Questions 5–10**, as typical of*

A both Chinese and Japanese pagodas
B only Chinese pagodas
C only Japanese pagodas

5 easy interior access to top
6 tiles on eaves
7 use as observation post
8 size of eaves up to half the width of the building
9 original religious purpose
10 floors fitting loosely over each other

Questions 11–13

*Choose the correct letter, **A, B, C** or **D**.*

11 In a Japanese pagoda, the shinbashira
- **A** bears the full weight of the building.
- **B** bends under pressure like a tree.
- **C** connects the floors with the foundations.
- **D** stops the floors moving too far.

12 Shuzo Ishida performs experiments in order to
- **A** improve skyscraper design.
- **B** be able to build new pagodas.
- **C** learn about the dynamics of pagodas.
- **D** understand ancient mathematics.

13 The storeys of a Japanese pagoda are
- **A** linked only by wood.
- **B** fastened only to the central pillar.
- **C** fitted loosely on top of each other.
- **D** joined by special weights.

POST-TEST EXERCISE

1. Complete the keyword table.

Keyword in questions	**Similar words in the passage**
in 1400 years.	
destroyed the pagoda	
The builders of pagodas knew how to *absorb some of the power* **produced by severe weather conditions**.	
easy **interior access** *to top*	
tiles on eaves	
use as **observation post**	
size of eaves **up to half the width of the building**	
original **religious purpose**	
floors **fitting loosely** over each other	
the shinbashira **stops** the floors moving too far.	
Shuzo Ishida **performs experiments** …	

2. Translate the following words into English.

1. collapse (v) ……………………………………
2. unscathed (adj) ……………………………………
3. mystify (v) ……………………………………
4. reinforce (v) ……………………………………
5. dampen (v) ……………………………………
6. dispense with (v) ……………………………………
7. constrained (adj) ……………………………………
8. resilience (n) ……………………………………
9. abrupt (adj) ……………………………………
10. consecutive (adj) ……………………………………