ABSTRACT: HOW LITTLE NOISE CAN BRING YOU PEACE

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Abstract. This extended abstract highlights the reason for our loss of concentration and possible remedy in the form of different types of noises. A correlation between noise levels and creativity is established and experiments conducted to verify this theory are cited.

1 INTRODUCTION

It is a common occurrence that when we are deeply engrossed in our tasks, even a slight sound is enough to break our concentration. This event can be traced back to human origin. It is common knowledge that human beings started out as hunters. And with evolution the most ancient parts of our brain like the *basal ganglia* which controls voluntary muscle movements like eye movements, cognition and even emotion, developed to keep us safe from threats. The problem now is that this part of the brain gets easily distracted when it notices changes, however small, in our vicinity, which can be something visual or even a noise. As a result, it becomes quite challenging to concentrate on something.

Research has shown that a controlled amount noise can help us get past this problem, specifically sounds that follow a certain pattern. An interesting aspect about our brain is that it senses whether the input it is receiving is changing or not. If the input follows a certain pattern, our brain actually stops processing the new information. Therefore, such type of noises help in calming our mind by masking out other sounds in the background and help us concentrate on our work. A certain level of noise can also help in improving our creativity by stimulating the creative part of our brain.

2 TYPES OF NOISE

2.1 White Noise

White noise comprises of random and equal amounts of frequencies from the entire sound spectrum. Our ears can only process a limited number of sound frequencies at any given time. White noise is created by utilizing all available frequencies of sound. This is the reason why white noise is most effective in masking other sounds and causes surrounding noises to fade in the background. Examples of white noise include radio chatter, static noise from television, etc. Benefits of white noises include effective masking of background noises, improved focus, etc.

2.2 Pink Noise

Pink noise also includes frequency from all available sound spectrum but unlike white noise, it puts emphasis on the lower frequencies to obtain a deeper sound. Since white noise includes all available frequencies, the overall frequency of white noise is relatively higher. Since human hearing is sensitive to high frequency sounds, most people find prolonged exposure to white noise irritating. Pink noise is a good alternative for them. Examples of pink

noise include heavy rainfall, rushing water, etc. Benefits of pink noise include masking of background noises, improved focus, comfortable sleep and it helps in calming young children.

2.3 Brown Noise

Brown noise takes the low frequency aspect of pink noise even further and puts extra focus on the lower frequency vibrations on the sound spectrum. This result in creating a noise pattern that sounds like a buzz or a deep hum. The deeper qualities of the noise are great for relaxing and falling asleep. Examples of brown noise include a low roar, flowing water and cloth dryer. Benefits of brown noise include effective relaxation and meditation, better reading comprehension, comfortable sleep. However, the preference for a certain type of noise varies from individual to individual. Persons who prefer a higher frequency noise would prefer white noise whereas persons who prefer a more relaxed deeper sound would prefer brown noise. Pink noise is for a moderate preference.

3 NOISE AND CREATIVITY: RESEARCH FINDINGS

The researches presented, in general theorize that a moderate level of ambient noise is likely to induce processing disfluency or processing difficulty, which activates abstract cognition and consequently enhances creative performance. Further, a high level of noise, however, reduces the extent of information processing, thus impairing creativity. Early studies in this topic were scarce, however they figured as precursors of new specific studies. Some of early findings that are noteworthy to mention are listed as follows:

- High level of noise reduces the individual performance on the Remote Associates Test (RAT). Its theorized that the high arousal provided by the noise reduces creativity (Martindale and Greenough, 1973; Hillier, 2006).
- Performance in writing poetry is impaired by exposure to a high level of pink noise. They speculated that in these circumstances the attention is narrowed and thus the creativity is reduced (Kasof, 1997).
- It is also theorized that the stress caused by the hig noise stress is the main reason for the reduction performance on creative tasks (RAT) (Hillier, 2006).
- High creative individuals had their creativity improved in RAT tests when exposed to moderate noise level. Their relate this finding with the level of arousal provided by the noise stimuli. They also claim that for that to occur the individual should have a intrinsic creativity that is evoqued when stimulated (Toplyn and Maguire, 1991).

Those beliefs, as aforementioned are base for what is now considered as the relation between creativity and noise level. From new researches, the proposed mechanism by which noise can affect creativity is speculated. This later studies add to the main mechanism by which noise affects distraction the fact that that processing disfluency induces a higher construal level, such that individuals engage in abstract thinking. Further, there is evidence relating a higher abstract thinking to greater creativity. It is explained by the fact that when people are thinking abstractly, they are less likely to fixate, and thus more creative, than those who are thinking concretely.

To summarize, Based on the above research, the distraction caused by a moderate level of noise leads to processing difficulty which implies in abstract processing, thus greater creativity. For the high noise level. A high noise level will also reduce creativity, which is given by the reduction in information processing. While a high noise level should also lead to a higher construal level, the reduced information processing counteracts this positive effect. As some part of brain that deals of processing of information also plays some cognitive role in creativity, this reduced processing can prevent individuals from thinking divergently, which is necessary for creative thinking. The next section, some Many new researches, with more specific setups were implemented and a clearer understanding of this dynamic seems to be

achieved, has it will be shown in the next section on empirical studies.

4 EXPERIMENTS: RELATIONS BETWEEN NOISE AND CREATIVITY

Experiments were conducted to see the effects of noise on creativity and innovative adaptability. To create ambient noise reflecting typical consumption a combination of multi-talker noise in a cafeteria is recorded to create a soundtrack. In addition, superimposed to form a digital soundtrack, which was plugged into speakers. The volume of the speakers was adjusted as needed to generate low (50 dB), moderate (70 dB), and high (85 dB) levels of noise. For creative performance, the Remote Associates Test (RAT) was used which has been widely used to assess creative thinking in both psychology & marketing research.

4.1 Experiment 1

The experiment was carried on the students in cafeteria, speakers were placed in a centre equidistant from all the desk (placed in the arc of the semicircle). For the high, moderate, and low noise conditions, the noise level was measured using a sound level meter before session and was kept constant at each desk. The speakers were then either turned on at the 85 dB, 70 dB, or 50 dB level or left turned off, depending on the condition; 8 RAT items were presented on the computer screen and recorded the responses of everyone separately.

The moderate noise condition generated more correct answers than those in the low & high noise. Thus experiment concludes that a moderate level of background noise enhances creativity relative to high, low, and no-noise conditions.

4.2 Experiment 2

It is intended to test whether construal level underlies the beneficial effect of moderate levels of noise on creativity and also whether reduced capacity of processing is responsible for the impaired creativity in the high noise condition. The task is to imagine as they are the mattress manufacturer and are looking for creative ideas for new mattress (Idea could be to geared new features or new product). Here, Quality of ideas was used to measure creativity and number of ideas & time spent on them were used to measure the extent of processing. The setup for the experiment is same as that of the experiment 1. The task is assigned to each one of them with no time limit. The computer is recording the results of the experiment that is idea as well as the time taken to generate them.

Total ideas generated were 211 & unique were only 112. At high noise conditions only fewer ideas were generated compared to moderate & low noise conditions. Time spent on moderate level is high compared to high level noise condition. For creativity, Unique ideas were judge by selective committee and rated accordingly. At moderate level noise condition more creative ideas were generated compared to high level noise condition. Thus, experiment concludes that a moderate level of noise leads to more creativity. And high level of noise led to reduce the capacity of processing.

4.3 Experiment 3

It is competing hypotheses & examines the role of processing disfluency (Interruption in the smooth flow) in the noise- creativity relationship. The main particular interest is in the process of mechanism underlying the beneficial effect of a moderate level of noise condition on creativity. To study in depth, the high level of noise condition is dropped. The task is to imagine the creative uses of bricks. This experiment used a 2 (noise level: Low v/s Moderate) multiplied with 2 (timing of task: Immediate v/s Delayed) between subjects design. The setup for the experiment is same as that of the experiment 1. The task is assigned to each one of them. The computer is recording the results of the experiment, but here the level of distraction is assessed not the completion of task.

Total ideas generated were 480. The Heart Rate and Blood Pressure were used to measure the arousal level. In Moderate level of noise condition, both heart rate & blood pressure was higher after the experiment began than after a delay. No such significance was observed in Low level of noise condition. And this led to greater processing of disfluency in moderate level of noise condition. Thus, experiment concludes that moderate level of noise induces both higher arousal and processing disfluency. And also enhances the creativity regardless of the timing of the task.

4.4 Experiment 4

In this experiment the multi-dimensional creativity is performed i.e., originality and appropriateness. The task is to imagine that you are going out to a banquet held by your new employer. You are all ready to leave for the dinner when you realize that your shoes are all scuffed up and they are noticeable. You have completely run out of polish and these shoes are the only ones that can go with your outfit, and there is really no other outfit you can wear. You have to leave in the next 2 minutes if you want to be on time. All the stores in your part of the town are closed for the evening. Although there is one shopping mall that is still open, it would mean an extra 5 miles of freeway driving. And the solution was asked to the participants.

Total ideas generated were 188 & unique were only 61. And those ideas were judge by selective committee and rated accordingly as the mean originality, novelty, and innovativeness. The ideas generated in the Moderate noise condition were more original and appropriate. Thus, experiment concludes that moderate levels of noise induce higher processing disfluency, which induces a higher construal level and abstract processing, and consequently enhances both the originality and the appropriateness dimensions of creativity.

4.5 Experiment 5

In this experiment we aimed to study the effect of noise on innovation adoption in a real-life setting. The task is performed in the student hostel lounge, where there is continuous noise. Two products were displayed on the screen (one innovative and another one traditional).

The moderate levels of noise not only lead to higher creative output but also enhance people's adoption of innovative products.

5 CONCLUSIONS

- Moderate level of background noise enhances creativity relative to a noise level. Rather high level of noise impairs creativity.
- Moderate level of noise produces just enough distraction to induce disfluency leading to higher creativity and very high level of noise induces too much distraction leading to lower creativity.
- Moderate level of noise not only enhances the creative production but also leads to greater adoption of innovative products.

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