


## ORIGINAL ARTICLE

# Concentration with Fitness Leads to More Work Productivity


## Konsentrasi dan Kebugaran Meningkatkan Produktivitas Kerja

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 <https://doi.org/10.18051/JBiomedKes.2022.v5.171-181>

### ABSTRACT

#### Background

Work productivity is important for a company to maximise company performance. Work productivity can be affected by concentration and physical fitness. Concentration is the ability to focus attention on work. Meanwhile, physical fitness is the ability of the body to perform activities without exhaustion. This study was conducted to determine the value of the relationship between concentration, fitness and employees' work productivity.

#### Methods

This study used a cross-sectional design. The subjects were employees of Cooperative Service Bandung, and the subject selection used non-probability sampling. Army Alpha Test measured concentration. A non-exercise fitness test assessed the level of physical fitness. Work productivity was assessed using a work productivity questionnaire. Data analysis was performed using SPSS version 20 with univariate analysis and bivariate Chi-square test. A total of 130 respondents participated in this study.

#### Results

The Chi-square test results showed a significant relationship between concentration level and work productivity ( $p=0.001$ ) and a relationship between the level of fitness and work productivity ( $p=0.031$ ).

#### Conclusions

Thus concentration and physical fitness lead to work productivity.

**Keywords:** Concentration; fitness; work productivity

## ABSTRAK

### Latar belakang

Produktivitas kerja merupakan hal penting bagi suatu perusahaan untuk memaksimalkan kinerja perusahaan. Produktivitas kerja dapat dipengaruhi oleh konsentrasi dan kebugaran jasmani. Konsentrasi adalah kemampuan memusatkan perhatian pada pekerjaan. Sedangkan kebugaran jasmani adalah kemampuan tubuh untuk melakukan aktivitas tanpa timbul rasa lelah. Tujuan penelitian untuk mengetahui hubungan konsentrasi, kebugaran dengan produktivitas kerja karyawan.

### Metode

Penelitian ini menggunakan desain *cross sectional*, dengan 132 responden dari karyawan Koperasi Bandung. Pengambilan sampel menggunakan *non-probability sampling*. Konsentrasi bekerja diukur menggunakan *Army Alpha Test*. Tingkat kebugaran fisik menggunakan tes kebugaran *non-exercise*. Produktivitas kerja dinilai dengan menggunakan kuesioner produktivitas kerja. Analisis data dilakukan secara univariat dan bivariat menggunakan SPSS versi 20, analisis bivariat dengan uji *Chi-square*.

### Hasil

Hasil uji *Chi-square* menunjukkan adanya hubungan yang signifikan antara tingkat konsentrasi dengan produktivitas kerja ( $p=0,001$ ) dan hubungan antara tingkat kebugaran dengan produktivitas kerja ( $p=0,031$ ).

### Kesimpulan

Konsentrasi dan kebugaran jasmani mendukung produktivitas kerja.

**Kata kunci:** Konsentrasi; kebugaran; produktivitas kerja

## INTRODUCTION

Work productivity is an achievement of employees in their workplace that can be measured by assessing the efficiency and effectiveness of the workers. Efficiency regarding time and resources used to finish a task, and effectivity regarding the workers' capability to solve and complete problems.<sup>1</sup> Work productivity is very important for every company because of the better the productivity, the better the outcome. The increasing level of productivity has become an important step in achieving economic growth.<sup>2</sup> Based on the survey done by the Japan External Trade Organization (JETRO), up to 55.8% of Indonesia-based Japanese companies are not satisfied with the productivity of the native worker because the work productivity level is lower compared to the productivity of the worker from other South-east Asia countries.<sup>3</sup> One of the factors that can affect someone's productivity is concentration level. Concentration is the capability to focus on the task without being affected by intrinsic and extrinsic factors from the surroundings.<sup>4</sup> Becchio et al. found that indoor air quality is a very important factor that affects workers' productivity. It was stated that workers are less likely to suffer from sick building syndrome symptoms in a working area with good air quality. Without these distractions, the workers can concentrate and perform better. The good quality of the working environment will increase productivity and reduce the days of absence.<sup>5</sup> Another study stated that distractions at work would affect concentration and productivity. The study also stated that distractions caused more than 93% of annual productivity loss in the USA at work. In comparison, productivity loss due to health-related absenteeism was only 6.4%.<sup>6</sup>

Another factor that affects work productivity is fitness level. Fitness can be described as the quality of being suitable for doing a particular activity without being tired, or it also can be described as being good enough to do something.<sup>7</sup> When people have a good body fitness level, they most likely can do well in all the tasks given to them. Hence, the higher the fitness level, the higher the productivity.<sup>4</sup> There are two conditions regarding body fitness related to productivity, absenteeism and presenteeism. Absenteeism is a condition in which a worker has to take sick leave due to illness or disability, and presenteeism is a condition in which a worker is not fit enough and has decreasing working performance. The consequences of these two factors are lowered productivity and, as a result, a higher profit-loss for a company. Therefore, companies implement health promotion and occupational health strategies to increase productivity.<sup>1</sup> Company also suppress the indirect presenteeism illness-related productivity loss cost that is usually higher than the direct medical costs.<sup>8</sup>

Several reviews have summarized the effect of physical activity and nutritional intervention on work-related outcomes, i.e. work productivity and absenteeism. But these reviews showed that the existing evidence is still unclear and insufficient.<sup>9</sup> Other studies found an increase in workability and reduced the need for recovery in workers after receiving 2-weekly aerobic exercise sessions for 12 months. However, this study also stated that exercise, although it increases workability, did not affect work productivity.<sup>10</sup> Another study concluded that physical activity might be related to absenteeism. It was stated that some studies have shown that there were significant relationships between physical activity and absenteeism and productivity, but it depends on the frequency and type of activity. A vigorous exercise done 1-2 times weekly significantly reduced absenteeism, but a higher frequency of physical activity was not related to a lower risk of absenteeism.<sup>11</sup> On the other hand, the results of other studies showed that participants who are given Stand Up Victoria intervention increase productivity. The increase in productivity can mostly be seen after 12 months, ranging from small to moderate improvements.<sup>12</sup>

Based on the variation in results of these studies and the importance of this matter, the study objective was to analyze the relationship between concentration and physical activity with work productivity. Hopefully, this study can contribute to companies in their effort to formulate specific health programs and interventions so that the workers' productivity can be increased and Indonesian workers' can compete with workers from other countries in terms of productivity.

## METHODS

This study was conducted with a cross-sectional design, held from November to December 2020 at the Dinas Koperasi dan Usaha Kecil (Cooperative Services) Bandung, West Java. The participants of this study were 130 employees of Cooperative Services Bandung, West Java. The selection of participants was made using a consecutive non-random sampling technique. The inclusion criteria were those registered as an employee of the public service office Bandung and signed the informed consent form. The exclusion criteria were those with a medical history of being diagnosed with Musculoskeletal abnormality and a history of energy drink consumption within the past week.

The concentration level was measured using the Army Alpha Test. This test consisted of 12 questions, each of which should be done in a specific time frame. The results are then classified into low (score : 0–4), moderate (score: 5–8), and high (score: 9–12).

This study's level of physical fitness was assessed using a non-exercise fitness test. In this test, all the participants had to fill out the “physical activity rating” form, and their body weight and height were measured. The fitness level was determined by using the non-exercise fitness test formula. The result was classified based on the Cardiorespiratory Fitness Category table.

Work productivity was assessed using a work productivity questionnaire. This questionnaire consists of 12 questions. The results are then classified based on the score into four categories. The categories are high productivity (score: 61–100), moderate productivity (score: 41-60), low productivity (score: 21–40) and very low productivity (score : 0–20).

Data analysis was performed using Statistical Package for Social Sciences (SPSS) for Windows 20.0 version with univariate and bivariate analysis. In univariate analysis, the description of the participants was tabulated regarding age, sex, concentration level, fitness level, and work productivity. The bivariate analysis was done using the Chi-square test with a p-value < 0.05. There were two bivariate tests done in this study. The first test analysed the relationship between concentration level and work productivity, while the second bivariate test was done to analyze the relationship between fitness level and work productivity.

This research received ethical approval from the Medical Research Ethics Commission of the Faculty of Medicine, Universitas Trisakti, with an ethical clearance letter number 51/KER-FK/10/2020.

## RESULTS

### *Demographic, Fitness, Concentration and Productivity Distribution*

The data distribution regarding all variables collected from all the participants is shown in table 1. This study shows that more than 63% of the respondents are male, and the majority are aged 30–39 years old (43.8 %), followed respectively by the 40–49 years old group (33.8 %), <29 years old group (12.3 %), 50–59 years old group (8.5 %), and 60–69 years old group (1.5 %). Regarding the results of the non-exercise fitness test, the majority of the respondents have good fitness level (48.5 %), followed by fair fitness level (40.8 %), excellent fitness level (6.2 %), poor fitness level (3.8 %), and very poor fitness level (0.8 %) (table 1). Therefore, the classification of fitness level is narrowed initially from 5 to 2 categories – good and fair, so it can fulfil the requirement of the chi-square test and can be analysed. To do so, the excellent category is merged with the good category become the good level of fitness, and the fair, poor and very poor categories are merged into the fair category (table 2).

For the concentration level, the army alpha test results showed that most respondents had high concentration levels (60.8 %). Regarding work productivity, most of the respondents had a high level of productivity (90.8 %), and the other 9.2% had a moderate level of productivity.

**Table 1.** Distribution of demographic, fitness, concentration, and work productivity

Variable	Frequency (n=130)	Percentage (%)
Sex		
Male	82	63.1
Female	48	36.9
Age group		
< 29	16	12.3
30 – 39	57	43.8
40 – 49	44	33.8
50 – 59	11	8.5
60 - 69	2	1.5
Fitness level		
Excellent	8	6.2
Good	63	48.5
Fair	53	40.8
Poor	5	3.8
Very poor	1	0.8
Concentration level		
High	79	60.8
Moderate	51	39.2
Low	0	0
Work productivity		
High	118	90.8
Moderate	12	9.2
Low	0	0
Very low	0	0

#### *Fitness and Concentration with Work Productivity*

The score from the non-exercise fitness test showed that 54.6 % of the participants had an excellent and good fitness level, while the other 45.4% had a fair fitness level. It can be concluded that the participants already had a reasonable effort to maintain their fitness. WHO stated that people aged 18-64 can increase their body fitness by doing medium-intensity cardio exercise for at least 150 minutes each week or high-intensity aerobic exercise for 75-150 minutes and reduce their sedentary lifestyle.<sup>13</sup> Doing physical activity regularly can make someone feel energized and can perform their work without feeling exhausted.<sup>14</sup>

**Table 2.** Concentration and Fitness level with a work productivity level

Variable	Work productivity				p-value
	High		Moderate		
	n	%	n	%	
Fitness level					
Good	68	95.8	3	4.2	0.031 <sup>a</sup>
Fair	50	84.7	9	15.3	
Concentration level					
High	77	97.5	2	2.5	0.001 <sup>a</sup>
Moderate	41	80.4	10	19.6	

<sup>a</sup>Chi-square test

The results for the work productivity in this study were those with a high level of productivity (90.8 %) and moderate (9.2 %), with no participants having a low or shallow level of productivity. Shobe stated that work productivity could be used as a parameter of how efficient and effective the workers' resources were in achieving optimal results. The study also showed a correlation between job satisfaction and work performance. The physical work environment and management support were also factors that related to work performance and productivity.<sup>15</sup>

## DISCUSSION

There was a significant relationship between concentration and productivity ( $p < 0.001$ ). The employee with a high level of concentration had a good level of work productivity. All participants with high concentration levels (97.5 %) showed high productivity, and only 2.5 % had moderate productivity. All participants with moderate concentration levels (80.4 %) showed high productivity, and 19.6 % had moderate productivity. In this study, no participant exhibited low concentration. This result can happen because the company is following the government policy to limit the number of workers that work from office up to 50% due to the Pandemic. Besides, the working area is not an open space, so the workers are divided into several rooms according to their respective divisions. As a result, the working area of each division is quite calm and not noisy, so the workers can concentrate in finishing their work. In experimental electro-physiological studies, the medial prefrontal cortex was found important for attentional function. The neurotransmitter, i.e. acetylcholine, dopamine and norepinephrine were very important in affecting attentional function.<sup>16</sup> Factors that affect concentration level such as dietary intake and nutritional status could affect brain neural function. Without adequate intake, low glucose level will disturb the ATP-production process and neurotransmitter synthesis; the result affecting one's capability to concentrate and eventually effecting work performance.<sup>17</sup>

In general, factors affecting concentration is divided into 2 groups, the exogen and endogen factor. The exogen factors are factors that come from the work environment such as lighting, air quality, visual disturbance, noise, and temperature. The endogen factors from our internal capacity such as psychological factor (motivation, stress, etc.) and nutrition status affecting neural function. These factors can affect work engagement and productivity.<sup>17-19</sup>

Work engagement is a condition where the worker absorbed in their work with dedication and having a fulfilling-work-related state of mind.<sup>2</sup> Another internal factor is the neural factor such as cortisol level. Higher levels of cortisol is linked to cognitive deficits, and modifications in long-term-potential processes involved in memory. In a study on substance use disorder patients, it was shown that the higher cortisol level is associated with lowered cognitive function i.e. attention, short-term memory, working memory, and executive functioning of the brain.<sup>20</sup>

Environment has an impact on one's ability to remain attentive in their task and retain information received. The source of distraction can be internal factors (i.e. mind wandering), and also external factors (noise from our environment). These distractions can cause lapses of attention and as a result decreased work performance (i.e. slower reaction time, errors, and poor information retention).<sup>18</sup> Another study stated that the ability to focus on a goal-relevant aspect was affected by the ability to inhibit distraction from the environment. It was stated that inhibiting

distraction was not simply determined by the importance of the distractor related to work but also affected by the learning experience with the distractor and involving some neural mechanism.<sup>21</sup>

Noise from the working environment was also a factor that affected concentration levels. A study showed that although the level of occupational noise was still within the normal range, based on the international standard for daily exposure, the noise would have a negative effect on work productivity, health condition and work satisfaction. The negative effects of noise exposure can vary from sleeping problems and fatigue to headaches and lowered quality of life. The noise sources can be from working equipment, building facilities, air conditioning units, computers, and daily conversation.<sup>22</sup> Another study showed that working space temperature could affect work capacity. Increasing heat stress causes a decrease in work capacity and results in a decrease in work productivity, an increase in labour cost, and an increased risk of occupational disease.<sup>23</sup> Another study had similar results where a high-temperature work environment can cause distraction in work performance. This is due to a general feeling of exhaustion, discomfort and heat-exposure hyperpnea. There will be reduction of work hours, and decreased work productivity.<sup>24</sup> Other factors that can affect work productivity are shift work and motivation. In shift work, worker has to do tasks in a period of time when the circadian level is low. The disturbance of circadian rhythm will produce the negative effects on attention, and decreased of attention leads to decreased work productivity.<sup>25</sup> As for motivation, a study showed that a psychological climate of caring in the working place will increase motivation and affective reaction of the worker and has been linked to work performance and productivity.<sup>26</sup>

The relationship between fitness level and work productivity was statistically-significant ( $p = 0.031$ ). The employees with good fitness level had good level of work productivity. A similar result was found in another study using “sit less, move more’ intervention. In this study, workers were asked to change occupational sitting habits with some movements or short walks. This study found that this intervention allowed workers to increase their physical activity during work hours and turn out to be feasible and effective for increasing work productivity in a sedentary workplace.<sup>27</sup> Another study showed that after 12 months of Stand Up Victoria intervention, workers had increased work productivity ranging from small to moderate improvements.<sup>12</sup> On the other hand, another study found that 2-weekly aerobic sessions for 4 months made no differences in working ability and productivity between intervention and control groups. The work ability showed an increase after a 12-months aerobic session, but still showed no effect for the work productivity.<sup>10</sup> Kerner et al stated that physical activity may be related to absenteeism (and indirectly related to productivity). Several studies found significant relationships between physical activity and absenteeism, but depends on the frequency and intensity of the activity. Vigorous exercise twice a week is significantly related to absenteeism, while higher frequency of exercise was not related to lower risk of absenteeism.<sup>11</sup>

This study showed that participants with good level of fitness and high level of productivity was 68 participants (95.8 %) and participants with good level of fitness and moderate level of productivity was only 3 persons (4.2 %). From all the participants with fair level of fitness, 84.7 % had a high level of productivity and 15.3 % had moderate level of productivity. Thus, this study showed that not only did the participants with high level of fitness had high level of productivity, but those with fair level of fitness could have similar results. This result can happen because the study was conducted in a company where the activity of the worker didn’t need much physical activity. Most

of the time, the workers sit in front of their computers, finish their task with a minimal physical activity involved. If we take closer look to the group with lower productivity, we can see that 15.3% of participants with fair fitness level have moderate productivity, while only 4.2% of participants with high fitness level have moderate productivity. So, participants with a fair fitness level have a higher chance of having moderate productivity than participants with a high fitness level. Maghfiroh, in her study, stated that most workers suffer from fatigue after working hours, but they spend their leisure time resting so they can work well the next day. Besides, many participants had worked for several years and were accustomed to high-intensity work, so overcoming fatigue by resting was sufficient to continue work the next day.<sup>28</sup> Another study found that every occupation had different physical activity and rest time during work hours. Some occupations had high-intensity activity, but those workers spent their leisure time in sedentary activity. In contrast, office workers had higher sedentary time during work but spent their leisure time doing moderate to vigorous physical activity. Thus, assessing the needs and designing interventions to improve the workers' occupation-based physical fitness is very important.<sup>29</sup>

The "happy-productive workers" thesis states that well-being is a key factor affecting work productivity. It can be concluded that a higher level of workers' well-being, physically and mentally, is associated with higher productivity. Therefore, companies attempt to implement programs to improve workers' well-being and increase productivity.<sup>30</sup> Sjoogard et al. stated that a worker with a low fitness level would cause higher expenses and burden on the company. The expenses and burdens include more absenteeism leading to a decrease in productivity.<sup>31</sup>

The limitation of this study was that the fitness measurement used a non-exercise fitness test. However, this technique was taken into consideration because the study was conducted during the first months of the Pandemic.

Based on these results, it is very important to have another study using different tools to measure the fitness level, concentration level, and work productivity level and analyse factors that can influence one's productivity so that a more comprehensive conclusion can be made. Furthermore, regarding the concentration level and productivity, it is also important to have another study about the exogen factors that can cause a distraction to the worker, such as air quality, temperature, workspace layout, and lighting, so that elements can be controlled to improve the concentration and work productivity of the employee.

## CONCLUSION

Based on this study, it can be concluded that there is a significant relationship between concentration and work productivity ( $p = 0.001$ ) and a statistically significant relationship between fitness and work productivity ( $p = 0.031$ ). Therefore, it can be concluded that employees with higher concentration levels have higher work productivity and those with higher fitness levels have higher productivity levels.

## ACKNOWLEDGEMENT

The authors want to thank the employees of Dinas Koperasi dan Usaha Kecil Bandung that were involved in this study, and also want to thank the Faculty of Medicine Universitas Trisakti for the support during the whole publication process of this article.



## AUTHORS CONTRIBUTION

IKD: Study concept and design, data collection, analysis and interpretation of results, preparation of manuscripts; FC: preparation of manuscripts, and corresponding author.

## FUNDING

This research was carried out with the researcher's funds.

## CONFLICT OF INTEREST

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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