

**Malaysian Journal of Social Sciences and Humanities (MJ - SSH)**

Volume 1, Issue 3, June 2016

e-ISSN : 2504-8562

Journal home page:
www.msocialsciences.com**A Study of the Usage of Biofeedback Techniques to Improve Self Performance and HRV Profile Among Ikhtiar Malaysia Entrepreneurs****Nazrolnizah Mohamad Noorzeli¹, Muhammad Nubli Abdul Wahab¹**¹Centre for Modern Language & Human Sciences,
Universiti Malaysia Pahang (UMP)

Correspondence: Nazrolnizah Noorzeli (nieza_zally@yahoo.com.my)

Abstract

Self performance is important among entrepreneurs due to increasing the business enhancement. Nevertheless, previous literature showed that there are less current study which focused on the self performance using Biofeedback techniques among entrepreneurs in Malaysia. Thus, this study was aimed; 1) to look at how Emwave Biofeedback techniques can be used to improve self performance among Ikhtiar Malaysia women entrepreneurs and 2) to improve the HRV score among participants through increased the HF coherence. A total of 10 respondents were recruited in this study. The changing nature of Heart Rate variability (HRV) of HF, LF and VLF frequencies was measured through Biofeedback Emwave training techniques. The HRV Biofeedback techniques were used to determine the emotional state and the balance ability between individual Sympathetic and Parasympathetic systems. This balance is important to enable women entrepreneurs to control internal and external stimuli to be adapted to their business environment. The study showed that the technique is able to improve the characteristics of HRV to increase self performance among women entrepreneurs. The study found that respondents who successfully completed the HRV training able to increase their self performance in term of HRV score and businesses. Result showed that there was a positive correlation (0.80-1.00) between all the business and HRV. This showed that Emwave Biofeedback training is appropriate to be used as an intervention program to improve self performance and business enhancement among the participants. Thus, this study concludes that HRV Biofeedback techniques can be an important measure in gauging business entrepreneur's health and performance.

Key words: self performance, women entrepreneurs, biofeedback, heart rate variability**Introduction**

Entrepreneurship in Malaysia has evolved since Malaysia gained independence in 1957. Entrepreneurship is an area of commercial potential in improving the economic performance of a country (Aouni & Surlemont, 2008). Success and economic production, spearheaded by business, entrepreneurship and marketing plays an important role in improving the NKRA year after year (Ahmad Badawi, 2006). History proves entrepreneurship have long been established in Malaysia since the start of trading activities using the barter system. Economic activity has continued to explore the business activities on a small scale and expanded to international trade (Nor Aishah, 2002 & Shukor, 2003). According to *Kamus Dewan Bahasa dan Pustaka Fourth Edition* (2009), the entrepreneur is defined as a person who undertakes an enterprise or entrepreneur. While according to The

Encyclopedia Americana International Edition, the entrepreneur is defined as a businessman or women who risked combining factors of production such as capital, labor, materials and rewarded through profits from the market value of goods. Besides, *Webster's Third New International Dictionary* defines an entrepreneur as a person who manages an economic activity, owns, manages and assumes the risks of a business. Entrepreneurs are individuals who do business and have been established in terms of the daily needs but has ambitions to expand its influence and wealth (Adnan & Mohamad Dahlan, 2002). According to Richard (2009), the entrepreneur is a person engaged in the business of either selling or trading goods and is the sole owner of the business. The word “*entrepreneur*” is in English and is derived from the French “*entreprendre*” which means bear or try. While in Malay language entrepreneurs term actually comes from the word meaning business efforts including counsel, events, deeds and other things to carry out or complete a job (Abdullah, 2010). Therefore, the entrepreneur can be defined as people who have a broad view of business where they are always looking for business opportunities (Arif et. at., 2010).

Biofeedback training technique is a method used to help individuals make the internal control yourself as the mind, emotions and heart (Sutarto, 2008). Biofeedback techniques have been identified as be able to detect emotional disorders and provide intervention. The Biofeedback techniques are being used to measure internal characteristics changes such as physiological and psychological changes. The Biofeedback devices are being fitted to a client in order to obtain physiological changes data. Through Biofeedback techniques, the mind changes could be measures by using the EEG. The changes in the heart is being measured through the HRV and the emotional changes are being measured through the EMG. Through this technique, the performance of individual self-control is known and displayed by computer. This technique is used to determine the emotional state of individuals and their ability to balance between Sympathetic and parasympathetic systems of individuals. This balance is essential to enable women entrepreneurs of Ikhtiar Malaysia to control internal and external stimuli in improving their self performance and to adapt their business environment.

According to Garet, M. et al. (2004), the performance of activities associated with HRV and good breathing control. This is because HRV is an important instrument in controlling the emotions of individuals. A study conducted by Tharion et al. (2009) about the relationship of students with HRV and respiratory control resulted that the students will get a low score of HRV and high respiratory cycle in stress situations such as exams, while HRV scores will increase and decrease respiratory cycle during the holiday period because of the lack of pressure faced. The results of the findings showed that HRV and respiratory control has a direct relationship to improve individual performance. According to Masahito et al. (2013), an individual is earnest to do a business because they love their business. The concept worked diligently described by Hedley (2006) can be characterized as a determination of an individual's capacity to work hard to achieve successful in life. In business, the concept of this hard-emphasized was determine in the research by Anne (2008), which means the extent of a person's working hard to develop themselves in the field of business undertakings. Adam Barsky (2008), reported that the earnest nature is very important to the entrepreneur as an individual who has the passion to succeed will use internal and external ability to work vigorously to ensure that the goals that wish to achieve in business is done.

Literature Review

Ikhtiar Malaysia is a private Unit Trust established on 17 September 1987 by a Deed of Agreement and registered under the Trustees (Incorporation) Act 1952 (amended 1981), (Act 258). Ikhtiar Malaysia is administered by a Board of Trustees composed of senior officials representing the Ministry of Finance, Economic Planning Unit, Coordination and Implementation Unit, the Ministry of Rural and Regional Development and a number of individuals who are appointed on the basis of personal capacity (Ikhtiar Malaysia, 2013). In the field of entrepreneurship, there is no single definition of entrepreneur conclusive due to its *multi-disciplinary*. Generally the definition of

entrepreneur can be categorized into four categories: economics, sociology, psychology and management.

First: Economic Perspectives

Defines entrepreneurs through the contribution and role in the broader development of the economy. Example: an efficient distribution of economic resources, providing jobs and trigger innovation.

Second: Sociological Perspectives

Defines entrepreneur as one generation or group of people that makes entrepreneurship as a career field that can change the status of an independent life. Example: survival immigrant communities such as China, Indonesia, Bangladesh and so on.

Third: Psychological Perspectives

Entrepreneurs with a view to defining the behavior as well as personal characteristics and personality. Example: how to stem risk-taking self-control, the will to achieve, fear of failure and so on.

Fourth: Management Perspective

Defines entrepreneurs as a strategic manager in which the role of the entrepreneur is to keep the business profitable and growing. Examples: strategic management tools used to achieve business objectives.

Anne (2008) stated that individual entrepreneur as innovative and expect high achievement. Successful entrepreneurs tend to take risks that has been planned and has a high internal control (Aouni & Surlemont, 2008). Besides Arif et al. (2010) define entrepreneurs as people who commit welfare reform or innovation for its own organization. While Greene (2012) defines as individual entrepreneurs who set up a business and manage to get profit and continue to grow. As summarize, entrepreneurs are individuals who take the risk to start a business or to set up and working. This means that entrepreneurs who want to succeed must have a critical and innovative thinking to ensure that the success achieved is in line with the objectives of the business.

According to Burch (1986), self performance and psychophysiological enhancement are important to develop human capital and self esteem among entrepreneurs. John G. Burch (1986), reported an entrepreneurs must have nine attributes as follows:

1. Desire to achieve: the initiative to solve problems and create successful ventures.
2. Working hard: work drunk attitude.
3. Attitude of defense: a willingness to lead and oversee their efforts until they can be independent.
4. Admission charge: the willingness to take responsibility efforts in terms of moral, legal and mental health.
5. Orientation reward: the desire to get rewarded for effort, the rewards can take a form other than cash such as recognition and respect.
6. Optimistic attitude: adopt the philosophy that now is the best time and any attempts to do.
7. Orientation to excellence: the achievement of something that will give pride.
8. Management: skills in combining materials and the management of human effort.
9. Orientation to profit: the desire to get a reward, but profit is the only measure of success.

Based on the importance of self performance and nine attributes of entrepreneurs mentioned above, we can conclude that the entrepreneurs needs to have two properties, namely the nature of the “desire to achieve” as well as properties which are available on the “ability to work hard”. In other words, entrepreneurs should vigorously avoid idleness for sure what is gained from the business was as planned during the first venture into the world of business.

Biofeedback Module Intervention

According to The Association for Applied psychophysiology and Biofeedback (AAPB), Biofeedback Certification International Alliance (BCIA) and The International Society for Neurofeedback and Research (ISNR), provides a definition of Biofeedback in 2008 as:

"It is a process that enables an individual to learn how to change physiological activity to improve health and performance. Use the right equipment to measure physiological activity such as brain waves, liver function, breathing, muscle activity, and skin temperature. Using of this equipment with fast and accurate action will give 'feedback' on the information to the user"

Biofeedback is a process for the realization of an individual's physiological functions by using equipment that gives information about the activities of the same system, with the goal of manipulating the information in question as a response. The process can be controlled include brainwaves, muscle, skin conductance, heart rate and the perception of pain. Biofeedback can be used to improve health, improve performance and measure physiological changes of thought, emotion and behavior. This becomes even more apparent when one examines the two basic words consisting of Biofeedback word of "bio" refers to the aspects of biological therapy and "feedback" (feedback) and it is a stimulus to encourage individual behavior change internally.

Measurement the Improving Of HRV VLF, LF and HF Spectrum

Proper breathing produced Heart Rate Variability (HRV) at a maximum level. Proper breathing techniques allowing respiratory oxygen supply at the optimum level during breathing longer than exhale (Gevirtz R. & Lehrer P. M., 2003). It will increasing the physiological system and balancing the heart rate (HR), emotional, hormonal and autonomic functions. Andreassi (2007) reported that HRV responded reflects a person's ability to adapted stress and environment. Normal HRV characterized by regular rhythmic, associated with various reflex concerned with the physiological regulation including respiratory reactions (Task Force, 1996 & Berntson et al., 1997). Increased in HRV means a better interaction between Sympathetic and Parasympathetic in Autonomic nervous system, and potentially lead to an increase in the function of a body systems (Tiller et al., 1996 & McCraty, 2006). According to Lehrer et al. (2000), Biofeedback can mediate homeostatic conditions in the body because it enables the cardiovascular system featuring continuous rhythmic variations. Biofeedback display the process of breathing, respiratory rate, and respiration amplitude. Through this, the respondents practicing breathing with a large amplitude and low rates. Vaschillo et al., (2006) reported that HRV Biofeedback produces an increased in HRV within a few minutes of initial training. Research has shown that the maximum increase in heart rate produced when the amplitude of the cardiovascular system is stimulated by the beat frequency of 0.1Hz breathing. Most individuals can learn Biofeedback training by slowing the rate of breathing (six breaths / min) to the resonant frequency of each individual. Breathing in the resonant frequency will maximize the HRV (Lehrer, 2007) and increase the energy in the low frequency (LF) band (0.05 to 0.15 Hz) and peak frequency of about 0.1 Hz. LF represents Sympathetic and Parasympathetic stimulation. In the main arterial cardiovascular system sensors called baroreceptors convey information to the liver sinus node to optimize system homeostasis in blood pressure. Maximum control of HRV can be achieved by most individuals after four sessions of training (Lehrer, 2007). According to Moss and Shaffer (2009), respondents can maximize the HRV to create a calm mental state, positive emotions and breathing correctly at a rate of about 5-7 breaths per minute. The respiration rate is important as breathing induces heart rhythm, coupled with positive emotions to maximize the HRV in the LF range because it affects the respiratory, autonomic activity and blood pressure regulation. When respiration occurs heart rate (HR) in sync with the breathing. At the end of inhalation, heart rate reaches a maximum and at the end of exhalation heart rate reaches a minimum. In the context of earnest nature, people are able to make a good control of VLF seriousness earnest than people who are not able to control the VLF.

Research Objective and Hypothesis

Objective: Measuring the profile of Heart Rate Variability (HRV) among participants

Research hypotheses of this study were as follows:

- I. The success participants obtained lower score of VLF spectrum than those who are less success in term of business performance.
- II. Participants who are less success obtained LF spectrum score lower than the participants who have highest profit.
- III. There is a strong relationship between highest profit participants with the HRV LF spectrum.
- IV. There is a strong relationship between lowest profit participants with the HRV VLF spectrum.

Methodology

This part will be explained on research methodology which consisted of the selection of respondents, procedures and data analysis.

Measurement of HRV data

Measurement of HRV data through scores of respondents to measured the self performance, through the detection of a relationship between HRV and business profitability.

Document Analysis

To obtain the characteristics of entrepreneurs in term of business management. Through document analysis, analysis of sales and purchase ledger is collected to identify the entrepreneur daily profit, gain or income earned to classified as profit or lose. Next, the financial management of debit and credit ledger balance showing no capital leakages and wastage does not occur. The perfect stocking ensure enough stock and meet the needs and requirements of the clients.

Biofeedback training session

Emwave training sessions were conducted in a quiet room. Each participant attends a training session at the same time and same day each week. Training was provided to the participants after a brief training before each session. Biofeedback training protocol by Lehrer (2000) adopted in this study. Participants are introduced to Emwave Biofeedback equipment, training methods and protocols. Participants also advised to breathe in a relaxed state of mind and breathe in a resonance frequency to measure the heart rate variability (HRV). They were instructed to breathe with rate of 6.5, 6, 5.5, 5 and 4.5 breaths per minute for about 2 minutes each to find their resonance frequency at the highest score (Lehrer et al. 2000).

Procedure

Participants HRV coherence recorded five times per session and sessions are repeated for 5 sessions within 5 weeks of using the procedure prescribed in the training. The training sessions are carried out based on previous studies that can improve performance. Respondents are advised to sit quietly. Then, Emwave ear sensor are plugs to observe participants heart rhythm either at VLF, LF or HF score. Heart rate will be measured and recorded using EmWave Desktop Software Kit device to track their emotions through their heart rhythm pattern. In the first procedure, respondents are advised to remain silent and calm. Recording stopped after 3 minutes. Secondly, participants required to reduce their movement and focus completely. Respondents were also advised to keep calm themselves and feel more relaxed, the HRV coherence getting better before the recording stopped after 3 minutes. In the third session, respondents were advised to calm down and think of a more peaceful for getting the results of

reading HRV coherence improved to the HF and LF frequencies higher than VLF. The next session participants is introduced with proper breathing techniques to breathe slowly (longer during inhale) and slowly exhale. The purpose of this training is to get HF and LF frequencies higher than VLF and ensure that participants understanding the proper breathing techniques. In the last session, they were still to be encouraged about proper breathing. They further advised to control breathing as taught. Participants are encouraged to get a 100% score of HF, and 0% score of LF and VLF.

Previous Studies on Biofeedback Performance Enhancement

Biofeedback techniques have been approved to measured nature of depressed (stress). According to Zaichkowsky and Fuchs (1988), Biofeedback detecting and enhancing the physiological process of converting difficult information to the useful information in term of meaningful, timely, accurate, and consistent. Griffiths (1981) reported that earnest individuals using Biofeedback training to reduce the symptoms of stress. Griffiths (1981) found that anxiety associated with improved performance. With increasing pressure, the performance of complex tasks is enhanced. Meanwhile, Diane & Cindra (2010) reported that stress is a part of the lives of individuals who are working. Earnest individuals use Biofeedback training as a tool to avoid feeling depressed and found stress fade away after Biofeedback training.

Biofeedback training also have been used to enhance sport performance. According to Maryn et al. (2006), Biofeedback is a training to overcome the individual's stress response. Biofeedback training conducted vigorously effectively helped athletes concerned about their sports performance. Biofeedback enables athletes to increase muscle movement and increase the performance of individual sports (David M. & Konno J. (2009), reported that Biofeedback training seriously improved the performance of individuals who suffer from stress and anxiety on athletic performance. The basic training is to mobilize athletes' external locus of control to an internal locus of control. Whereas Bradley D. L. (2011), found when athletes strive for Biofeedback training, they managed to coped with problematic situations and increase their self-confidence. Biofeedback training increased individual stamina and improve athletic performance

In Malaysia, a research conducted by Vitasari (2011) in her study entitled "The Effect of Biofeedback Intervention Programme on Anxiety Among Engineering Students at Universiti Malaysia Pahang", found Biofeedback training method are useful to engineering students at UMP reduced anxiety and increased of focus on their studies. These approved that Biofeedback techniques should been used to enhance performance. Biofeedback techniques been used successfully increased the level of concentration of students and improved their results in academic achievement. The study showed that students are able to improve the performance of Cumulative Grade Point Average, improve study skills, manage their time well and reduce nervousness when presenting a proposal.

Biofeedback as Intervention Techniques

Biofeedback technology has proven its effectiveness in improving the performance of humanities systems worldwide. Various benefits have been derived from previous studies using Biofeedback technology. In Malaysia Auditya (2010); Vitasari (2011) and Wang Jing (2013) reported in their thesis that Biofeedback has proven effective in improving performance. Vitasari (2011) found Biofeedback techniques have been successfully used to increase the level of focus and thus improve the results in academic achievement of the students. While Auditya (2011) reported Biofeedback training methods have been effective in improving cognitive performance of women factory production operator in Kuantan, Pahang. Results showed that there is a significant change in the improvement of cognitive performance of female employees when using Emwave Biofeedback training. In addition, Wang Jing (2013) Reported Biofeedback helped women students in college improved their concentration in prayers.

Meanwhile Abdul Rahman (2007), found communities development in Malaysia can be implemented with ongoing Biofeedback training strategy. While in business, research by Bagozzi et al. (1999) found that setting business goals is more achievable for individuals when using Biofeedback training. Bagozzi reported an increased on sales and positive attitudes by sales people who undergoing Biofeedback training. As a conclusion, based on previous studies described above, the use of Biofeedback training is effectiveness in various fields to enhance human performance among individuals who undergoing the training.

Finding and Result

The study showed that the technique is able to measure HRV and increase self performance. These data are compared with the findings of the correlation analysis to find the relationship between the respondents, the data sample and the results of HRV analysis of financial data in terms of profitability. Result showed that theres a strong positive correlation between all of the business data and HRV data obtained of between 0.80-1.00. The findings showed that theres significant between HRV and business.

Table 1: The range of the amount of profit

| Category | Range Of Profit (RM) | Number Of Participants | Percentage Of Participants (%) |
|----------|----------------------|------------------------|--------------------------------|
| 1 | 0.00 – 3,000.00 | 2 | 17% |
| 2 | 3,000.01 – 6,000.00 | 5 | 66% |
| 3 | 6,000.01 – 9,000.00 | 3 | 17% |
| Total | | 10 | 100% |

Table 1 shows the range of amount of profit divided into 3 categories, which is 17% (n = 2) at the high level income (RM6000 to RM9000), followed by 66% (n = 5) of modest profit (RM3000 to RM6000) and by 17% (n = 3), the lowest profit of about RM3000 for a period of 6 months. Data showed that the highest percentage (66%) is moderate. Referring the above description, this study analyzes the business profile of earnest among entrepreneurs can be measured in terms of business success. The following table is respondents who obtained the best HRV score differentiated with respondents who obtained the lowest score.

Table 2: HRV individual reaction: pre and post
(Respondent undergo training and Biofeedback protocol)

| Sampel | Pre | Post |
|--------------|------|------|
| Respondent 1 | 41 | 90 |
| Respondent 2 | 15 | 85 |
| Respondent 3 | 13 | 100 |
| Respondent 4 | 19 | 93 |
| Respondent 5 | 10 | 97 |
| Average | 19.6 | 93 |

HRV Coherence Average Rate (%)

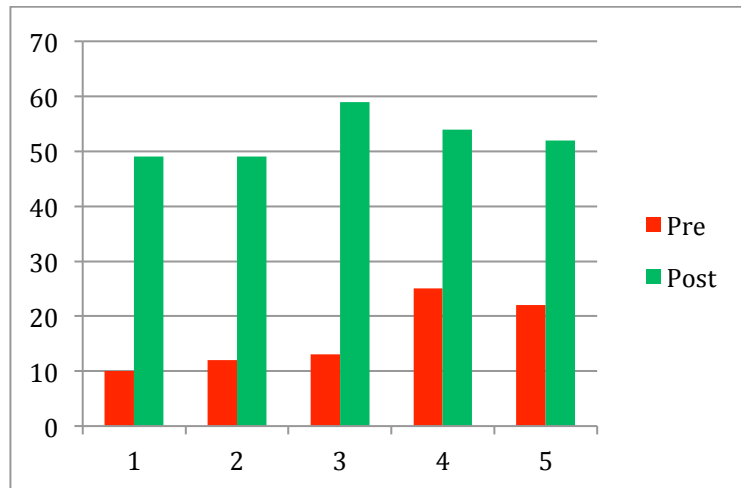
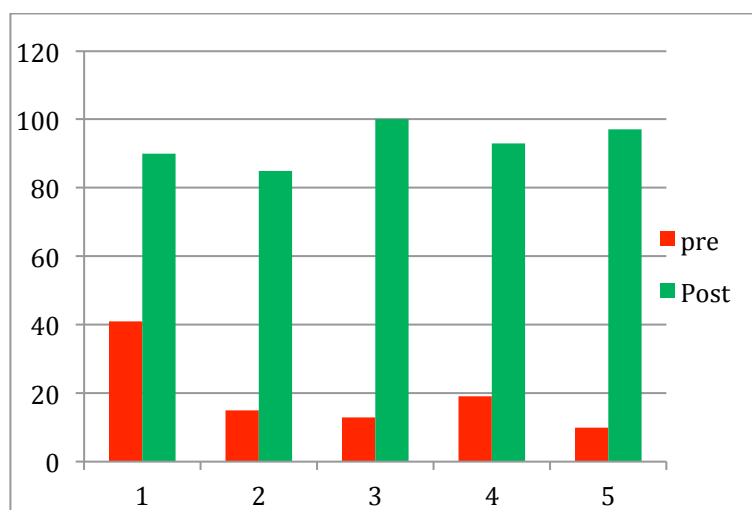


Table 3: HRV individual reaction: pre and post
(Respondents who did not undergo Biofeedback training and protocol)

| Sampel | Pre | Post |
|--------------|------|------|
| Respondent 1 | 10 | 49 |
| Respondent 2 | 12 | 49 |
| Respondent 3 | 13 | 59 |
| Respondent 4 | 25 | 54 |
| Respondent 5 | 22 | 52 |
| Average | 16.4 | 52.6 |

HRV Coherence Average Rate (%)



The table below showed the overall average score of coherence HRV VLF to HF for those who undergo Biofeedback Training (Group 1) compared to those who did not undergo Biofeedback training and protocol (Group 2) of five training sessions were conducted.

Table 4: HRV individual reaction: pre and post
(Respondents who undergo Biofeedback training and protocol)

| Sampel | Group 1 | | Group 2 | |
|---------------|-----------|-----------|-----------|-----------|
| | Pre (VLF) | Post (HF) | Pre (VLF) | Post (HF) |
| Respondent 1 | 19.8 | 67.6 | | |
| Respondent 2 | 8.8 | 65.4 | | |
| Respondent 3 | 27.4 | 55.0 | | |
| Respondent 4 | 29.2 | 63.8 | | |
| Respondent 5 | 27.6 | 50.4 | | |
| Respondent 6 | | | 30.4 | 31.8 |
| Respondent 7 | | | 37.6 | 31.4 |
| Respondent 8 | | | 46.2 | 30.2 |
| Respondent 9 | | | 34.4 | 38.6 |
| Respondent 10 | | | 50.8 | 29.4 |

Table 4 shows the performance of each respondents with an average overall score of coherence is 22.56% for pre (VLF) and 60.44% of the post (HF) for respondents who undergo Biofeedback training and protocol while the average for respondents who did not undergo Biofeedback training and protocol is 39.88% for pre (VLF) and 32.28% (HF) for the post. This indicates that respondents who undergo Biofeedback training showed increased in coherence HF score better after resonance breathing exercises than ever before, while for those who did not undergo Biofeedback training scored minimum level of coherence. These had proved that respondents who undergo Biofeedback training scored high level of coherence HRV HF and have a good breathing pattern.

5.1: Respondents Undergo Biofeedback Training and Protocol

| Sampel | Respondents Undergo Biofeedback Training and Protoco | | | | | |
|--------------|--|--------------------|----------|---------------------|--------------------|----------|
| | Very Low Frequency (VLF) | | | High Frequency (HF) | | |
| | Mean values | Standard Deviation | Variance | Mean values | Standard Deviation | Variance |
| Respondent 1 | 19.8 | 12.85 | 165.2 | 67.6 | 21.45 | 460.3 |
| Respondent 2 | 8.8 | 9.31 | 86.7 | 65.4 | 28.79 | 828.8 |
| Respondent 3 | 27.4 | 33.05 | 1092.3 | 55.0 | 36.93 | 1363.3 |
| Respondent 4 | 29.2 | 31.32 | 981.2 | 63.8 | 31.81 | 1011.7 |
| Respondent 5 | 27.6 | 21.47 | 460.8 | 50.4 | 35.87 | 1286.8 |

5.2: Respondents who did not undergo Biofeedback Training and Protocol

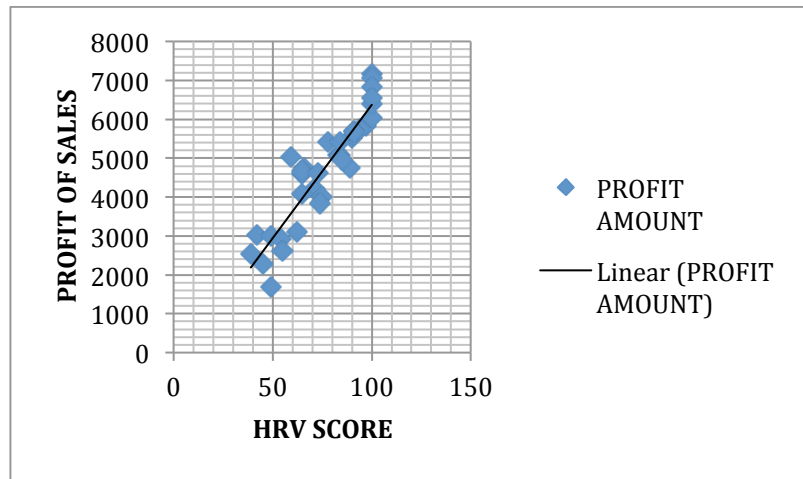
| Sampel | Respondents who did not undergo Biofeedback Training and Protocol | | | | | |
|---------------|---|--------------------|----------|---------------------|--------------------|----------|
| | Very Low Frequency (VLF) | | | High Frequency (HF) | | |
| | Mean values | Standard Deviation | Variance | Mean values | Standard Deviation | Variance |
| Respondent 6 | 30.4 | 19.54 | 381.8 | 31.8 | 15.34 | 235.2 |
| Respondent 7 | 37.6 | 18.8 | 353.3 | 31.4 | 15.68 | 245.8 |
| Respondent 8 | 46.2 | 18.31 | 335.2 | 30.2 | 19.04 | 362.7 |
| Respondent 9 | 34.4 | 16.52 | 272.8 | 38.6 | 10.45 | 109.3 |
| Respondent 10 | 50.8 | 14.99 | 224.7 | 29.4 | 14.52 | 210.8 |

Result showed that the group who undergo Biofeedback training have better scores for the mean values and standard deviation compared to the group who did not undergo Biofeedback training. Biofeedback training methods should been used for measuring entrepreneurs HRV profile indirectly, have been a factor to increase HRV profile and performance among entrepreneurs.

Reviewing the significant relationship between business data and the findings of HRV data

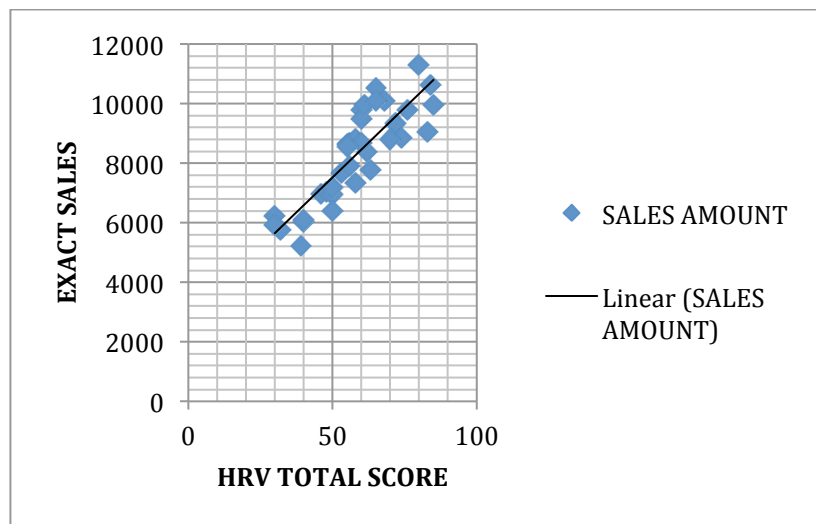
Correlation is a statistical term that expresses the linear relationship between two or more variables. The correlation coefficient used when analyzing the relationship between the two variables i.e Y and X. Therefore, the relationship to determine whether X is the real cause of the problem or not can be determined by evaluating the correlation of reading media. In this study, the Spearman rank correlation type has been used. Below were the results of a statistical Correlation using the Spearman rank correlation type had been used in the study to examine the relationship between HRV score and business profitability.

Figure 1: Correlation of HRV HF in session 5 with the amount of profit of sales = 0.920



Correlation values found a very strong positive correlation between HRV HF in session 5 with the amount of sales profit which is 0.920.

Figure 2: Correlation score of session 5 (Total Score) with accumulate amount of sales = 0.861



Correlation values found a very strong positive correlation between correlation score of session 5 (Total Score) with accumulate amount of sales which is 0.861

Summary of results

Results of the correlation above showed that there is a very strong positive correlation between all of the business profitability data and HRV scores between 0.80-1.00 (Highly strong correlation) and showed that there were significant and strong relationship between participants business profit and sales with the results of HRV scores in terms of the cumulative score, Total score, HRV HF and HRV LF spectrum.

Recommendation

Implemented the Biofeedback Emwave module would helped entrepreneurs improve self performance and enhance business success. This technique should be implemented in daily life to improve individual internal physiological conditions through psychological changes. With respect to experimental procedure, to obtain more reliable and complete HRV data, physiological stress profile should be administered over ten minutes with each period of measurement taking a minimum five minutes recording. Longer time recording also allows analyzing the relationship between changes in physiological, psychological and performance. Furthermore, it is also important to examine the effects of HRV biofeedback between sessions not only in physiological measures but also in psychological parameters. Following a study by Lehrer et al. (2003), it may be necessary to evaluate all these parameters at minimum three sessions. As this study was relatively short follow-up period, more attention should be given to conducting long term follow-up. Finally, underlying mechanism on the role of autonomic nervous system regulation in improving performance still needs further investigation.

Limitations and Future Research

This research is limited to measure self performance and HRV profile among Ikhtiar Malaysia Entrepreneurs. This study was limited in several ways which would decrease the ability to generalization issue in other settings. The samples only involved AIM women entrepreneurs and limited to the district town. Thus the findings are limited to the scope of the small sample size of 10 people. Further research may consider using various performance indicators which focus more on individual or organization. The results might be different if the scope of the study is extended to others entrepreneurs. Although several studies using HRV Biofeedback (Lehrer, 2003) have revealed that there are long-term changes associated with this technique, the results of this study cannot be generalized to long-term changes in HRV. It is still unclear whether the training effects of HRV Biofeedback enlarge, decrease, or remained consistent over time. Future studies may consider the use of other diversity indicators to assess the nature of conscious entrepreneurs as well as using this Emwave Biofeedback training. To the best our knowledge, this is the first randomized control trial examining the effect HRV Biofeedback on both objective and subjective performance measurement. Data suggested that subjects learned successfully to shift their HRV toward LF range as well as regulate their respiration rate in a relatively short time period. Similar to these findings, previous researches indicated that maximal control over HRV at the resonant frequency can be obtained in most people after approximately four sessions of training (Lehrer et al., 2003).

Conclusion

The present study is among the first to examine the effects of HRV Biofeedback training to measure self performance and HRV profile among Ikhtiar Malaysia entrepreneurs. This study used resonant breathing strategy which is aimed to teach the subjects breathe correctly following their resonant frequency. Result showed that improved autonomic nervous system or homeostatic regulation was noted in the training group after attending five sessions of HRV Biofeedback training. Moreover, the

quantitative results did support most of the hypotheses. The Biofeedback training participants showed significant improvement in percentage of LF activity and breathing rate. Participants also displayed significant improvement in attention, memory, and focused. It indicated that HRV Biofeedback training indeed show potential to be applied as entrepreneurs performance enhancement strategy in business. Future studies are warranted in larger and heterogeneous sample to further clarify the interrelationship among autonomic functioning and business performance. Thus, this study concludes that HRV Biofeedback techniques can be an important measure in gauging business entrepreneur's health and performance.

References

- Abdullah, S. (2010). *Nilai Inovasi, kreativiti perlu dalam keusahawanan*. Kuala Lumpur: Malaysia.
- Abdul Rahman Embong. (2007). *Pembangunan Negara, Komuniti dan Insan Melampaui 2020*. Bangi: Institut Kajian Malaysia dan Antarabangsa.
- Adam, B. (2008). Understanding the Ethical Cost of Organizational Goal-Setting: A Review and Theory Development. *Journal of Business Ethic.* 2008, 63-81.
- Adnan, A. & Mohamad Dahlan, I. (2002). *Keusahawanan di Malaysia: Keusahawanan Islam*. Kuala Lumpur: Prentice hall Pearson Malaysia.
- Ahmad Badawi, A. (2006). Ucapan Bajet 2007. *Pembentangan Bajet 2007*. Dewan Rakyat, Kuala Lumpur.
- Andreassi, J.L. (2007). *Psychophysiology Human Behaviour and Physiological Response*. (5th ed.) New Jersey: Lawrence Erlbaum Associates.
- Anne, S. (2008). Universities: An entrepreneur's Ecosystem. USM.
- Aouni, Z. & Surlemont, B. (2008). Entrepreneurial Competencies within the Process of Opportunity Recognition (Interactive paper). *Frontiers of Entrepreneurship Research*, 28(17).
- Arif, A.H.M., Bidin, Z., Sharif, Z. & Ahmad, A. (2010). Predicting Entrepreneurship Intention among Malay University Accounting Students in Malaysia. *UNITAR e-journal*. 6 (1).
- Auditya P.S. (2011). *The Effect of Heart Rate Variability Biofeedback Training for Improving Cognitive Performance among Female Manufacturing Operators*. Ph.D. Thesis. Universiti Malaysia Pahang.
- Bagozzi, Richard, P., & Utpal, D. (1999). Goal Setting and Goal Striving in Consumer Behavior. *Journal of Marketing*. 63,19-32.
- Berntson, G.G., Bigger, J.T., Eckberg, D.L., Grossman, P., Kaufmann, P.G., Malik, M., Nagaraja, H.N., Porges, S.W., Saul, J.P., Stone, P.H., & Van Der Molen, M.W. (1997). Heart Rate Variability: Origins, methods, and Interpretive Cavats. *Psychophysiology*. 34: 623-648.
- Bradley, D., Yani, L.D., Philip, D., & Vecchio, D. (2011). Cognitive Assessment in Behavioral Sport Psychology. *Behavioral Sport Psychology*. pp 79-95.
- Burch, J. G. (1986). *Entrepreneurships*. The University of Michigan. New York: John Wiley & Sons Publication.
- Diane, L.G., & Cindra, S. K. (2010). *Gender in Sport and Exercise Psychology*. Handbook of Gender Research in Psychology. Springer New York. 563-585.
- David, M. & Konno, J. (2009). The Religious Time Bind: US Work Hours and Religion. *Social Indicators Research*. (93), 209-214.
- Dewan Bahasa dan Pustaka Fourth Edition. (2009). Kuala Lumpur. Dewan Bahasa dan Pustaka.
- Gevirtz, R., & Lehrer, P.M. (2003). *Resonant Frequency Heart Rate Biofeedback*. In Biofeedback: A Practioner's Guide (3rd ed.) pp. 245-250. M. S. Schwartz and F. Andrasik (Eds.). New York. The Guilford Press.
- Greene, P. (2012). *Entrepreneurial Ecosystem: growing entrepreneurial communities creating wealth and social justice*. Forum edisi 2012. Kolej Babson. USA.
- Garet, M., Toumaire, N., Roche, F., Laurent, R., Lacour, J.R., Barthelemy, J.C. & Pichot, V. (2004). Individual interdependence between nocturnal ANS activity and performance in swimmers. *Medical Sciences Sport Exercise*. 36(12), 2112-8.
- Griffiths, T., Steel, D., Vaccaro, P., & Karpman, M. (1981). The Effect of Relaxation Techniques on Anxiety and Underwater Performance. *International Journal of Sport Psychology*, (12), 176-182.

- Hedley, C.N. (2006). What Does It Mean To Love Your Job: Investigating The Construct. *Paper Presented at the Meeting of the Academy of Management*, Atlanta, August, 2006.
- Ikhtiar Malaysia. (2013). *Pembangunan Usahawan Ikhtiar: Inisiatif Amanah Ikhtiar Malaysia*. Kuala Lumpur: Penerbit Bahagian Pembangunan Usahawan. Risalah Terbitan Tahunan 2013.
- Lehrer, P.M., Vaschillo, E.G., & Vaschillo, B. (2000). Resonant Frequency Biofeedback Training to Increase Cardiac Variability: Rationale and Manual for Training. *Applied Psychophysiology and Biofeedback*, 25 (3), 177-191.
- Lehrer, P.M., & Kranitz, L. (2003). Biofeedback Applications in the Treatment of Cardiovascular Diseases. *Cardiology in Review*, 12(3), 177-181.
- Lehrer, P.M. (2007). *Biofeedback Training in Increase Heart Rate Variability*. In *Principles and Practice of Stress Management*. (3rd ed.). New York; The Guilford Press.
- Maryn, Y., De-Bodt M., & Van Cauwenberge. P. (2006). Effects of Biofeedback in Phonator Disorders and Phonatory Performance: A Systematic Literature Review. *Applied Psychophysiology and Biofeedback*, (31), 65-83.
- Masahito, S., Junichiro, H., Leo, O.O., Maria, K. & Paul, L. (2013). Heart Rate variability Biofeedback Improve cardiorespiratory resting Function during Sleep. *Applied Psychophysiology and Biofeedback*, 38 (4), 265-271.
- Moss, D., & Shaffer, F. (2009). Respiratory Training and Heart Rate Variability Biofeedback for Anxiety Disorders and Functional Medical Disorders: Respiratory Psychophysiology. *Workshop Notes. The 13th Annual Meeting of Biofeedback Foundation of Europe, Eindhoven, Netherlands: 2009, February 24.*
- Nor Aishah Buang. (2002). *Asas Keusahawanan*. Shah Alam: Penerbit Fajar Bakti Sdn. Bhd.
- Richard, G.S. (2009). *Are People Getting Smarter?*. Human Intelligent and Medical Illness, the Springer Series on Human Exceptionality, 1-8.
- Shukor Omar (2003). *The Malay Lost World with Emphasize on Entrepreneurship*. Kuala Lumpur: Anzagine Sdn. Bhd.
- Sutarto, A.P., & Abdul Wahab, M.N. (2008). The effect of Heart Rate Variability Biofeedback for Improving Operators' Cognitive Performance (CD ROM). *Proceedings of Fifth International Cyberspace Conference on Ergonomics*.
- Task Force of the European Society of Cardiology and the North America Society of Pacing and Electrophysiology. (1996). Heart Rate Variability: Standard of Measurement, Psychological Interpretation and Clinical Use. *European Heart Journal*, 17(3), 354-381.
- Tharion, E., Parthasarathy, S. & Neelakantan, N. (2009). Short term Heart rate Variability measures in Students during Examinations. *The national medical Journal of India*, 22(2), 63-66.
- Vaschillo, E., Vaschillo, B., & Lehrer, P.M. (2006). Characteristics of Resonance in Heart Rate Variability Stimulated by Biofeedback. *Applied Psychophysiology Biofeedback*, 31(2), 129-142.
- Vitasari, P., & Abdul Wahab. (2011b). *The Effect of Biofeedback Intervention Programme on Anxiety among Engineering Students at Universiti Malaysia Pahang*. Ph.D. Thesis at Faculty of Technology, Universiti Malaysia Pahang.
- Wang Jing. (2013). *An Investigation on Devoutness Islamic Prayer among Female College Students through Biofeedback*. Master Thesis. Universiti Malaysia Pahang.
- Zaichkowsky & Fuchs, L.C. (1988). Biofeedback Applications in Exercise Athletic Performance. *Exercise and Sport Science Review*, (16), 381-421.