A Pilot Study on

Therapeutic Effects of Laughter Therapy on Intrinsic Motivation and Psychophysiology in the workplace

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History of Therapeutic Laughter

Many individuals have contributed to the history of modern Therapeutic laughter. It is beyond the scope of this training to Talk about all of them. We have chosen to highlight those who have inspired the development of Cardio Laugh and Laughter Yoga Therapy by Dr. Van Ram

NORMAN COUSINS, celebrated writer:

In 1979 he published a book 'Anatomy of an Illness' in which he described a potentially fatal disease he contracted in 1964 and his discovery of the benefits of humour and other positive emotions, in battling it. He found, for example, that ten minutes of mirthful laughter gave him two hours of pain-free sleep. His story baffled the scientific community and inspired a number of research projects.

DR. WILLIAM F. FRY, psychiatrist, Stanford University, California:

He began to examine the physiological effects of Laughter in the late 1960s and is considered the father of 'gelotology' (the science of laughter). He demonstrated that most of the body's major physiological systems are stimulated by mirthful laughter. One of his studies confirmed that 20 seconds of intense laughter, even if 'faked', can double the heart rate for three to five minutes. Dr. Fry proved that mirthful laughter provides good physical exercise and can decrease your chances respiratory infections. He showed that laughter causes our body to produce endorphins (natural painkillers).

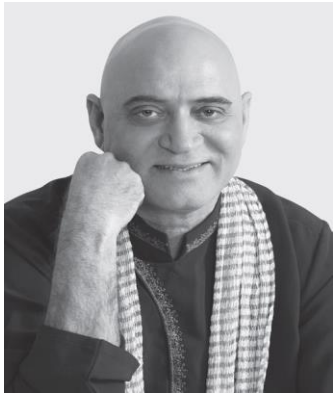
DR. LEE BERK, PhD, Loma Linda University Medical Center

Inspired by Norman Cousins, Dr. Berk and his team of researchers from the field of psycho-neuro-immunology (PNI) studied the physical impact of mirthful laughter. In one study heart attack patients were divided into two groups. While one was placed under standard medical care, the other half watched humorous videos for thirty minutes each day. After one year the 'humour' group had fewer arrhythmias, lower blood pressure, lower levels of stress hormones, and required lower doses of medication. The non-humour group had two and a half times more recurrent heart attacks than the humour group (50% vs. 20%).

DR. HUNTER (PATCH) ADAMS, MD

Immortalized in film by Robin Williams, Patch inspired millions of people by bringing fun and laughter back into the hospital world and putting into practice the idea that "healing should be a loving human interchange, not a business transaction". He is the founder and director of the Gesundheit Institute, a holistic medical community that has been providing free medical care to thousands of patients since 1971. He is the catalyst for the creation of thousands of alternative therapeutic care worldwide.

It is important to realize that all these individuals relied on humour to create and/or study the effect of laughter.



DR. MADAN KATARIA, MD

In March 1995 this medical doctor in Mumbai, India was writing an article 'Laughter - The Best Medicine' for a health journal. In his research he discovered many modern scientific studies that described at great length the many proven benefits of laughter on the human mind and body. In particular, Dr. Kataria was impressed by Norman Cousins' book 'Anatomy of an Illness' and the research work by Dr.Lee Berk. Profoundly inspired and being a man of action, Dr. Kataria immediately decided to field-test the impact of laughter on himself and others.

DR. VAN RAM, POSITIVE PSYCH, GELOTOLOGIST, SGLY

First to popularise this therapy in Singapore. Since 2010.

In July 2013, Sing-health invited this therapist to share on Laughter Therapy to more than 500 international medical doctors, at the opening of the Academia. He is personally trained and Inspired by Dr. Kartaria, Therapist Van Ram researches on "Therapeutic Benefits - of Laughter", to employee health as pilot study with University of Derby, UK and found significant improvements on Sp02, heart-rate and intrinsic motivations. Therapist Van Ram offers "Laughter as an Exercise" and provides alternative therapeutic care to cancer stricken patients, stress, anxiety and depressive clients amongst other conditions, enabling them to laugh even when faced with adversity, his mission is to transform lives.

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Abstract

This study will explore the frequency of Laughter exercises in the workplace over two days and how it may positively affects intrinsic motivation at work, and help to exercise the participants with increased heart rate and blood oxygen as a cardiopulmonary workout for optimal functioning. In this report, the terms working professionals, professionals and the participants will be used interchangeably as to describe the population of study and its sample size. For the purpose of the study, Intrinsic Motivation was defined as a type of motivation characterized by high Interest/enjoyment, Perceived competence, Perceived choice and low Pressure/tension, based on Self-determination theory and the IMI questionnaire, 22-items version (STD, 2015) (Annex D). Psychophysiology is another important factor of our study, it is defined as the link between body and mind (Caccioppo, Tarssinary, & Bernston, 2000), in this case, specifically, as the effects of laughter on both physiology and psychology. The study focused on measuring the psychological and physiological responses of a group of professionals in a Multinational Project Engineering Management Company, Undisclosed, while they at work (N = 43), out of which 55.8% were females and 44.2% males, with multicultural backgrounds and working in Singapore. The participants self-reported with no known cardiopulmonary conditions. Therapeutic exercises were induced ranging from 3 and 6 exercises over a period of two days with the assistance of the Laughter Therapist, Van Ram (Ram, 2010) were performed. The participants' response before and after the stimulus was measured to monitor the increases in aspects of physical exertion (heart rate and oxygen saturation) and intrinsic motivationn. The psychophysiological response of their physical exertion was expected to change through the laughter exercises, and this will be determined by heart rate and functional oxygen saturation of arterial haemoglobin (Sp02) using an Oximeter to measure the human haemoglobin saturation and heart rate index through the finger of participants. The psychophysiological data from the Laughter exercises will be used as findings to explore further improvements for execution and delivery of Laughter exercises and its effects on the working professional to compliment with work functions. By analysing the data with the Paired Samples T-test, it was possible to explore the pre and post effects of the therapeutic stimulus, and the changes in scores over the two training sessions. The results support the idea

that laughter exercises can improve intrinsic motivation and can increase heart rate. To increase oxygen saturation, it is necessary to add a stronger focus on breathing exercises. The implications of the study are discussed.

Keywords: Intrinsic Motivation, Psychophysiology, Hemoglobin Saturation, Therapeutic.

Literature Review

Laughter is a universal aspect of human non-verbal communication. It occurs naturally and plays a big role in social interactions, however, it is only recently that laughter is becoming the subject of research. Laughter has been suggested to have many functions and benefits. It serves as a sign of social interest, as a way to induce positive attitude, as a way to induce positive affect that can broaden a person's capacity to learn and as a way of social bonding, facilitating pro-social behaviors and cooperation. Positive affect can be describe as the extent to which an individual subjectively experiences positive moods such as joy, interest, and alertness (Froh, 2008), also Laughter can trigger the endorphin system that can buffer the organism against pain and stress, as well as play a role in positive emotions and social bonding (Dunbar et al., 2011). Laughter is associated with positive emotions. It has been linked to amusement, however, there is evidence to suggest that laughter reflects a more basic positive social emotion. It suggests friendly interactions with an intent to play (Provine, 2013).

Laughter is normally under weak conscious control. Often, people can have a hard time eliciting laughter or inhibiting it, although it is easier to inhibit laughter than smiling (Provine, 2001). However, through exercises and work, it's possible to elicit conscious laughter.

Laughter has been used in therapeutic practice with proven benefits. It has mostly been used in healthcare settings, however, the results have shown that laughter therapy or conscious laughter can be beneficial for different aspects. One noteworthy aspect is significant stress reduction (Kaur & Walia, 2008).

This study explores the possible relationship of laughter, and the importance of its implications to other variable in the study, intrinsic motivation at work. Motivation is seen as the drive to act and to take action. The basic classification of active motivations defines two types: intrinsic

and extrinsic. Intrinsic refers to internal motivation that comes from the person. For example, interest in a topic can lead to the person being intrinsically motivated to study that topic. For the purpose of this study intrinsic motivations will be divided into these four categories that are centered on the individual employee task or work; interest/enjoyment, perceived competence, perceived choice and reduced pressure/tension. (Tsigilis & Theodosiou, 2003) Intrinsic motivation is believed to be stronger and to lead to a higher performance quality than extrinsic motivation, which is defined as motivation through external rewards and punishments (Ryan & Deci, 2000). The current study only considers intrinsic motivation.

There have been several scales and instruments developed for the assessment of intrinsic motivation. These scales have been based on the distinction between intrinsic and extrinsic motivation as seen in different areas of the person's life.

The questionnaire is the Intrinsic Motivation Inventory, which is a self-report measure for motivation that can assess the participants' motivation for specific activities. It has been established as valid and reliable, using six subscales, of which some may be used for the purposes of a specific study. For the purposes of this study, the 22 items version will be considered and included in the Annex A. This version includes interest/enjoyment (intrinsic motivation as it is), perceived competence (how competent the person feels at work), perceived choice (if the person feels they chose to work), and pressure/tension (Tsigilis & Theodosiou, 2003)

There is little research on the link between laughter and motivation, however, there are some studies that suggest that laughter can increase motivation to learn in the classroom, as well as boost participation and reduce anxiety (Stambor, 2006).

Fun and laughter was also seen to stimulate intrinsic motivation in athletes. It increases intrinsic motivation in a more natural way, so that people felt more motivated towards achievement and work without the need for implementing any extrinsic rewards (Burton & Raedake, 2008). In general, there is research to support the possibility of a positive link between laughter and intrinsic motivation which will be considered in the study.

Introduction

In the study, we explore how Laughter can be applied to intrinsic motivations to balance the stressors of our daily activities. It is something that occurs in all people as an innate expression and, seldom given credence to its immense value to the diverse vernacular of psychology. In recent years the topic has become more transparent and apparent to its positive effects on humans. Laughter has become the subject of scientific research that has been considered from different perspectives and implications. More researchers today promote new implications of laughter with inquiry into its merit and noteworthy of the positive effects from laughter on new variables and other aspects of human life.

Laughter can be defined as a vocal-respiratory-behavioral response that involves various sets of muscles, specific movements, facial and vocal expressions. In psychology, laughter is seen as the marker of positive affect and as a response that promotes positive states. It is usually not involuntary, but it can be (Ong & Van Dulmen, 2006).

Laughter has been associated with the brain, however, there is limited knowledge on what specifically occurs when a person laughs. There is evidence that the area of the brain involved in this response is the anterior part of the human supplementary motor area, as electrical stimulation of this area can elicit laughter. This part of the brain has been seen as a development that is specific to humans and is involved with specialized functions such as speech, laughter and manual dexterity (Bennett & Lengacher, 2006).

1. Uses of Laughter

Laughter appears to be ubiquitous in human interactions. It occurs everywhere, in all cultures

and in people of all ages. Laughter appears early in human development. At 4 months of age, the child can respond with laughter to tickling, something that is also true for children who are born death or blind. This would suggest that laughter has deep roots in human biology (Bachorowshi & Owren, 2004).

Laughter is something strongly tied to social interactions. It occurs more often in social than in solitary situations. Laughter can lead to positive emotional responses in those who listen to the laughter, which would further mark it as an aspect of human interaction first and furthermost. Laughter has been viewed as an evolutionary behavior that contributed to the formation and maintenance of positive emotions among humans who were not related to each other. Laughter serves as both a vocalization of a state of positive emotion and also induces positive emotions in other people (Bachorowshi & Owren, 2004). Of course, laughter is also an expression of joy and happiness most of the time (Dumbre, 2012)

Considering all these aspects, popularity of the subject has gain more light in research that investigates on pragmatic effects on laughter and its connections with different variables that appears to be focused on the good effects that laughter brings. As a social activity that elicits and expresses positive affect and emotions, the idea that laughter could influence more aspects in research, expands on the autonomy and to its existing body of scientific inquiry.

2. Laughter as an Exercise

Laughter has been applied in many environments. Over 30 years ago, it was first suggested that laughter might be used as a positive complement for medicine, for instance. It has been suggested that it could have potential medicinal benefits and a positive anti-stress effect. Laughter exercises have been developed and applied, the exercise took on a different form in laughter yoga, being practiced for health benefits and other series of benefits (Strean, 2009). Considering this use of laughter, it seems reasonable and purposeful to explore further on the benefits and being a technique that does not have any known side effects.

Different types of laughter therapy have appeared over the years. These have included Laughter Yoga, Humor and Laughter Therapy, Laughter Meditation and others (Dumbre, 2012)

3. Physiology of Laughter

Laughter has been linked, on a biological level, with reductions in stress and pain, as well as in healing improvement. In its Physiology, Laughter has been linked to increases in heart rate, respiratory rate, respiratory depth and oxygen consumption. After these increases, the person experienced a period of muscle relaxation and decreases in heart rate, respiratory rate and blood pressure (Strean, 2009).

Laughter has also been linked to a dilation of the inner lining of blood vessels and to an increase in blood flow. It also has a positive effect, through nitrate oxide, on inflammation. Laughter has been linked to a reduction of stress hormones, such as cortisol and epinephrine. It increases the release of endorphins, which can positively affect pain. It boosts the number of antibody producing cells and the effectiveness of T-cells, which gives the immune system a significant increase in its functioning (Dumbre, 2012).
In another study, laughter therapy, done through a humor therapy, was able to decrease chronic pain. Additionally, it had significant effects on the psychological and emotional state of the participants. It improved happiness and life satisfaction significantly and reduced the perception of loneliness (Tse et al., 2010).

Laughter has been applied with different populations and shown to be beneficial for many of them. For example, it was shown to improve the general health state of elderly adults in one study (Ghodsbin, Sharif Ahmadi, Jahanbin, & Sharif, 2015). Other articles have recommended the use of laughter therapy with children, adolescents and families, as well as made specific suggestions regarding those population (Pruder, 2003). This would imply that laughter could be applied in a wide population, considering that it doesn't require a difficult implementation, that it does not have side effects and that it does not require a significant physical effort or physical preparation.

Laughter therapy has also been linked to reduced depression symptoms and better sleep quality (Ko & Youn, 2011). This could be related to laughter having even more positive effects, however, many are still being investigated at the moment.

4. Psychology of Laughter

It has been seen that laughter can impact a person's physiological response and their mood or emotional state. Laughter has been shown to improve a person's mood, and as such a morale booster, bringing feelings of fulfillment that adds to self-esteem. People were shown to feel uplifted after laughing (Strean, 2009). Laugher has been used as a form of systematic desentisation and was shown to effectively reduce fear in phobia treatment (Ventis, Higbee, & Murdock, 2001).

Laughter is a psycho-physiological phenomenon. It involves a biological process, a biological response, a neural reaction, as well as an emotional response and a cognitive interpretation. Just as well, laughter can impact both a person's psychological state, affecting their emotions or ideas, and also their body, as it has been linked to specific changes in heart rate, respiratory rate and blood pressure. In terms of emotions, laughter has been linked to positive emotions and was thought to create a positive response in the individual who can hear the laughter (Bachorowshi & Owren, 2004; Strean, 2009; Marci, Moran & Orr, 2004).

Another important aspect of the study is intrinsic motivation. Intrinsic motivation is a well-established concept within psychology. It refers to a type of motivation that is connected to the enjoyment of the process, interest and satisfaction that is derived from their activity. A person with intrinsic motivation tends to have a better performance, because they are more invested in the process (Cameron, Pierce, Banko, & Gear, 2005). For this reason, research concerning intrinsic motivation has been popular, because it is a concept that is important in the workplace, as well as in training, coaching and education.

5. Intrinsic motivation

Intrinsic motivation is linked to achievement in a variety of settings. However, an aspect in which there is much controversy is the link between intrinsic motivation and rewards. Rewards are defined as the incentives or positive consequences that a person receives for doing something. An on-going debate has been taking place on whether or not rewards are always detrimental to intrinsic motivation. One side of the debate has argued that rewards are necessarily detrimental, because they are effective in getting a person involved in an activity,

but if they are gone, the person is no longer interested. Alternatively, others have argued that rewards could boost a person's motivation and performance and that their detrimental effects are significantly limited (Cameron, Pierce, Banko, & Gear, 2005).

It is important to note that in education or in the workplace, it is not possible to remove rewards completely. The workplace, for example, necessarily has rewards for the employees and workers in the form of a salary, bonuses and others. Removing them would be impossible. However, despite the presence of these rewards, it would seem important to increase a person's intrinsic motivation, so that their enjoyment of the working process and interest are increased to improve their motivation and their performance. However, there has been a significant body of research concerning intrinsic motivation and the workplace, suggesting that it is important to increase this variable (Thomas, 2002).

The current study is focused on examining the effects of laughter exercises in a workplace setting. Specifically, the study will consider the effects of laughter on intrinsic motivation of employees and if it has usefulness as a cardiopulmonary workout, increases heart rate and blood oxygen.

Laughter could have significant health benefits and involve simple, long term low-cost solutions that could improve an individual's health and motivation on the workplace. The exercises could be implemented without significant investments and have important repercussions. This shows that it is important to understand and find evidence for laughter's positive effects or lack of effect to see if this is a viable strategy for the future. Laughter exercises require little than an investment in the training, time and effort, making it an effective strategy that any workplace can adopt. If it is viable on the workplace, future research could establish its effectiveness for specific workplaces, as well as for other professional and non-professional settings, for instance, for educational institutions or other places in which the therapeutic benefits could be cost-effective and beneficial.

Theoretical framework

For this study, the theoretical framework that was chosen was selected primarily because of the intrinsic motivation component of the study, as the physiological responses that were also measured and considered could be reflected by objective measurements of biological responses, such as heart rate and blood oxygen levels. The only measure that was based on a theoretical idea was the intrinsic motivation variable.

One of the theories that have dealt more strongly with intrinsic motivation is self-determination theory, (Annex A). This theory was pioneered by Deci & Ryan and it focuses strongly on the internalization and internal processes of the individual over the external variables (Ryan, Patrick, Deci, & Williams, 2008).

Self-determination theory suggests that to change or maintain specific behaviors, for example, a good work performance, punctuality and other work-related behaviors, the person needs to internalize values and skills to change. The person needs to experience self-determination. Autonomy, competence and relatedness can improve self-determination and allow the person to internalize behaviors and maintain them. Developing a sense of autonomy and a sense of competence allows the person to self-regulate their behaviors (Ryan, Patrick, Deci, & Williams, 2008).

The theory argues that the person can experience two types of motivation. There are intrinsically motivated behaviors which are enjoyable, interesting, which the person chooses and is competent with. These behaviors usually are associated with more autonomy (Ryan, Patrick, Deci, & Williams, 2008).

There are also behaviors which are motivated by what self-determination theory defines as controlled motivation. This is a type of motivation that can occur in two ways. The first way is characterized by external regulation, in which a person acts only to get an external reward, avoid punishment or to comply with social pressures. The second way is called introjection. In this, a person acts a certain way to receive approval or to avoid disapproval or guilt. The characteristic of both forms of controlled motivation is that it rarely leads to long-term behavioral adherence, meaning that individuals who are motivated in this way to act, will not continue the behaviors for a long time, even if the external consequence or reward is there (Ryan, Patrick, Deci, & Williams, 2008).

The model depicted in (Annex A) is the self-determination continuum that has six points in a progressive motivation from amotivation to intrinsic motivation, scaled from left to right respectively. Amotivation can be described as a state of lacking any motivation to engage in an activity. The adapted model which aided the study excludes amotivation and external regulation because the intent was to monitor the influences on workplace training to increase the intrinsic factors. Considering that participants were beyond amotivation and external regulation having already commence in work for the base rewards salary or other external factors that includes compliance and to avoid punishment that are part of External regulation, and to focus on the other areas that are more intrinsically related that will be further examined and discussed for the purposes of this study. (Ryan, Patrick, Deci, & Williams, 2008).

The contrast to controlled motivation is autonomous motivation. It relates to identified regulation, one form of this type of motivation. In identified regulation, the person feels identified with the value of a specific behavior. There is an even more autonomous form of motivation, which is integrated regulation. In this form of autonomous motivation, the person values a behavior and also aligns it with other central values and lifestyle choices and patterns. Autonomous motivation, which is intrinsic, is associated with a higher maintenance of specific behaviors and with changes as well.

The person, to change or to maintain a behavior, needs to have input and support from their environment. They need to be provided with skills and tools that may help with the maintenance, as well as with the feedback and support that the person might need to continue with a specific pattern. The person's competence is encouraged and supported in its manifestations and is helped to overcome barriers that may stand in their way. The sense of competence appears when the individual is acting autonomously and has a sense of autonomy. When there is a sense of autonomy, the person engages in an activity of their own free will and with willingness to act and change (Ryan, Patrick, Deci, & Williams, 2008).

Another important aspect of self-determination theory is that the person is more motivated to change or maintain behaviors through relatedness. Relationships, for instance, work place relationships and social interactions can facilitate internalization. People are better able to internalize ideas from people who they feel respect them, care for them and understand them (Ryan,

Patrick, Deci, & Williams, 2008). For instance, a good boss in the workplace could facilitate learning or a good coach or coworkers with whom the person has a good relationship. A

positive coaching experience, for instance one based on laughter could increase a person's motivation, because it would improve relationships and show a care for the person.

Another aspect of self-determination theory involves goals and types of interventions. A focus on goals that are intrinsic, like personal growth, health and relationships is lined to better health and more intervention success. Extrinsic goals have been linked to less intervention success (Ryan, Patrick, Deci, & Williams, 2008).

Considering these aspects, laughter therapy can be seen as a good intervention within the self-determination framework. First of all, it teaches a skill and a knowledge that encourages the person's autonomy. Laughter exercises can be done in a group or individually, so the person can take responsibility for this aspect if they feel like it is something helpful for them.

Another aspect is on fostering the relatedness, an important concept within the self-determination. Laughter was shown to foster positive emotions among a group, allowing people to become closer and to feel positive emotions associated with each other, because many positive emotions associated with laughter appear when a person hears others laugh (Bachorowshi & Owren, 2004). So, laughter could reasonably help build connections and improve relatedness, improving the internalization process that can allow people develop a stronger internal motivation in the workplace.

Motivation can be linked to many different factors. One of these is stress. There have been studies on work stress and work motivation that have shown, work motivation is lower for those who are more stressed and less satisfied, and other aspects linked with stress (Li et al., 2014). Considering that laughter promotes stress relief and has been strongly linked to reduced stress levels (Dumbre, 2012), an indirect effect of laughter could be improving motivation by reducing stress.

Motivation has been linked to happiness in different settings. In one study, it was found that low-achieving students showed both moderate levels of happiness and of motivation. Self-efficacy (related to autonomy and competence) was associated with happiness with a positive correlation (Omar, Jain, & Noordin, 2013).

Not much research has been done on the specific link between intrinsic motivation and laughter. However, as shown above there are some studies showing that laughter can decrease stress and have other effects.

Another study has positively linked laughter yoga with an increase in well-being. The people who performed laughter yoga felt more positive emotions and less stress and anxiety immediately after laughter yoga sessions (Weinberg, Hammond, & Cummins, 2013).

Laughter therapy for just 15-20 minutes a day in the workplace for 10 days significantly reduced stress levels in participants who worked daily in a highly stressful environment (nurses) (Kaur & Walia, 2008).

In some studies, self-produced laughter showed little effects on the levels of stress of an individual associated with a future event (Rutdal & Frederick, 2014). However, it would be important to differentiate between simple laughter and laughter exercises, as well as between laughter that is meant to reduce the consequences of stress here and now, rather than prevent stress.

Definitions

For the purposes of this study, the variables that were considered were defined in a specific way to obtain clarity and a focused idea of what the study will be researching.

1. Laughter therapy

The first concept that was used was laughter therapy. The type of laughter therapy that was used in practice during the therapeutic training was based on the method of laughter therapist Jake Van Ram, which is why the definition was based on his idea of laughter therapy.

Laughter therapy is defined for purposes of the study as the purposeful increase of the laughter functionality to release stress and manage emotions through a healthy form of expression using natural and fake laughter (van Ram, 2010).

In this case laughter therapy was expressed in specific 3 and 6 laughter exercises adapted to the workplace that were implemented over the course of two days.

2. Laughter exercise

A laughter exercise can be defined as an exercise meant to help the person elicit laughter on purpose. Laughter exercises are specifically designed to turn laughter for the benefit of the person and to improve their current state in some way.

3. Intrinsic motivation

Intrinsic motivation for the purposes of this study is defined as a type of motivation characterized by high feelings of interest, enjoyment, perceived competence and perceived choice along with low levels of stress and pressure. Intrinsic measure is defined through the individual's subjective perceptions of these variables associated with a specific activity and in this case was the task related to work (SDT, 2015).

4. Psychophysiology

Psychophysiology is defined as the study of the link between the mind and the body (Caccioppo, Tarssinary, & Bernston, 2000). In this case, the psychological component of the study involved intrinsic motivation. In the case of the present study the physiological responses that were measured was the participant's heart rate and the functional oxygen saturation of arterial hemoglobin (Sp02), which is the oxygen in the blood. Pulse oximetry is a noninvasive method that enables the measurement of a person's blood oxygen saturation, which is often referred to as SpO2 or "The Fifth Vital Sign" (the first 4 being your pulse, temperature, blood pressure and respiratory rate). Pulse oximetry is a method doctor's use for rapid assessment and monitoring of a patient's respiratory function. It is also used to determine which patients might be suffering from hypoxia and should take additional tests. For a regular healthy person, the normal blood oxygen saturation level (SpO2) should be around 94% to 99%. For patients with mild respiratory diseases, the SpO2 should be 90% or above. Supplementary oxygen should be used if SpO2 level falls below 90%, which is unacceptable for a prolonged period of time. Optimal heart rate can be defined applied by using a person maximum heart rate during exercise roughly equals 220 minus age. (Annex C) The measurements were done using an Oximeter to establish the hemoglobin saturation and heart rate using the participant's reading through their finger. Laughter was seen as a psycho-physiological phenomenon, as it was

shown to have an effect on the person's psychological and physiological state (Bachorowshi, & Owren, 2004).

Measures

Three measures were employed in the study. Participants' heart rate and oxygen saturation in the blood was measured through an Oximeter using the index finger.

The study also used a questionnaire. The questionnaire that was used was the Intrinsic Motivation Inventory (IMI), which was meant to establish the levels of intrinsic motivation of the professionals while at work and see if there has been any change (Annex D)

The IMI is a multidimensional measurement device that assesses the participants' subjective experience of a target activity. It has been used in many experiments involving intrinsic motivation. The questionnaire assesses intrinsic motivation in terms of interest/enjoyment, perceived competence, pressure/tension and perceived choice. There are also effort and value (SDT, 2015), however, these variables were not considered in the current study definition of intrinsic motivation. These six subscales yield a score that provides a view of the person's intrinsic motivation in terms of a specific target activity, the activity for the purpose of this research was their perceptions at work (SDT, 2015).

The scale related to interest/enjoyment is the scale that is considered to measure intrinsic motivation per se. This is the largest subscale due to this consideration. Perceived choice and perceived competence are scales, because these variables have been linked to intrinsic motivation and have been considered positive predictors of self-reported intrinsic motivation. Pressure and tension are considered to be negative predictors of intrinsic motivation (SDT, 2015).

The IMI has varied items from these subscales. The items have been shown to be coherent when analyzed with factor analysis. They have also yielded stable results across a variety of tasks, conditions and settings. In short, the IMI is both valid and reliable (SDT, 2015).

The subscales have been proven to be independent, so researchers can use the subscales independently of each other. The order of presentation has been found to have negligible effects.

The items can be slightly modified to fit a specific activity (e.g., changing the tense or specific description of the task) without changing validity or reliability. The items are face-valid. Shorter versions of the questionnaire have also been found to be reliable (SDT, 2015).
There is a full item version that includes 45 items. There is also a standard 22-item version that has included interest/enjoyment, perceived competence, perceived choice and pressure/tension. This standard version is the version selected for the study. The IMI has been found to be valid and reliable through a series of experiments (SDT, 2015).
The IMI is a questionnaire developed within the framework of self-determination theory and has been used successfully within experiments done from the theoretical framework that this theory provides.
In short, the current study selected to use the IMI, the standard 22-item version that includes four subscales: interest/enjoyment, perceived choice, perceived competence and tension/stress. This version of the questionnaire has been found both valid and reliable and is a strong measure to assess intrinsic motivation.

1. Multicultural considerations

The participants were 40% Chinese and 60% Indian professionals, for a mixed group that included both local and expats working professionals. This means that individuals were at least from two cultural backgrounds and nationalities that were included in the study conducted in Singapore. The exercises that were induced was specific to communication in the workplace in a Singapore setting with the local lingo included to create a harmonious experience amongst the professionals. The study was not focused on establishing multicultural differences or similarities, however, it can be said that the participants showed similar results. It may be significant in the future to explore if culture can have an effect on laughter exercises. For

instance, if one individual's culture encourages laughter in daily life more or less could have an effect.

2. Procedure

The measures will be obtained on the 3rd and 4th December 2015, the consent was advised before the programme for implementation and before the commencement of activity on day 1, 3rd December 2015. Participants receives the soft copy via their emails during participation and inform consent (Annex E).
Participants already signed up and was prepared for the activity with no prior experience or knowledge of it and the research was complimenting the activity, the study was of obtaining measurements using an intrinsic motivation questionnaire, and an oximeter before and after the activity was taken to measure the effects of laughter exercises conducted by the therapist

The conditions whereby participants were during normal work and scheduled for the programme before lunchtime in a well-ventilated training room

Participants were asks if they had any cardiopulmonary conditions and all responded negative, and participants were functional without any prior form of physical activity in the workplace on the, that is otherwise work related

The participants were asked to complete the IMI-22 self-report through their mobile phones (Annex D). While the IMI-22 was administered, the Oximeter was applied to obtain the pre-test readings while the participants were seated. After the measurements were completed, the participants began the programme. The participants had a laughter warm-up and laughter exercises induced of day 1, three exercises and day 2, six exercises. After the laughter exercises were completed, the survey and measurements were repeated. The Oximeter was passed among the participants. After this, the data was recorded. The same procedure was repeated on Day 2. Procedure model as seen in (Annex B).

3. Hypothesis

According to Krejcie and Morgan (1970), to have a reliable sample from a population, there needs to be a sample size that for N = 43 participants with 95% accuracy would a random selection of 36. (Annex D)

The SPSS Software 23th edition, was use to compare two population means. Paired sample t-test was use in 'before-after' studies, as it was a case-control study. The participants were given the stimulus of 3 exercises and 6 exercises in over a period of two days, and compare the relationship the pre and post score as well as the change value, of intrinsic motivation at work based on IMI modified (Annex D) questionnaire, resting heart rate, and blood oxygen index.

Hypothesis 1: Laughter exercises increase heart-rate, blood oxygen and intrinsic motivation at work after the first session

Hypothesis 2: Laughter exercises increase heart-rate, blood oxygen and intrinsic motivation at work after the second session.

Hypothesis 3: Laughter exercises promote the goals of increasing heart-rate, blood oxygen and intrinsic motivation at work over two sessions

Data Analysis

Intrinsic Motivation [Day 1]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_intrinsic_motivation	98.69	36	7.198	1.200
	Post_intrinsic_motivation	102.08	36	6.394	1.066

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_intrinsic_motivation Post_intrinsic_motivation	-3.389	9.439	1.573	-6.583	-.195	-2.154	35	.038

- Sig. value is 0.038
- 0.038 < 0.05
- So Null hypothesis is rejected
- There is a significant different.

Resting Heart rate [Day 1]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre _Heartrate	77.89	36	12.160	2.027
	Post _Heartrate	87.19	36	11.546	1.924

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre _Heartrate Post_Heartrate	-9.306	18.314	3.052	-15.502	-3.109	-3.049	35	.004

- Sig. value is 0.004
- 0.004 < 0.05
- So Null hypothesis is rejected
- There is a significant different.

Blood Oxygen [Day 1]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_SP02Blood_Oxygen	89.72	36	12.687	2.114
	Post_SP02Blood_Oxygen	92.81	36	7.775	1.296

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP02Blood_Oxygen – Post_SP02Blood_Oxygen	-3.083	13.739	2.290	-7.732	1.565	-1.347	35	.187

- Sig. value is 0.187
- 0.187 > 0.05
- So Null hypothesis is fail to reject.
- There is no any significant different.

Findings of day 2

Intrinsic Motivation [Day 2]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_intrinsic_motivation	91.50	36	4.067	.678
	Post_intrinsic_motivation	101.53	36	5.180	.863

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre_intrinsic_motivation Post_intrinsic_motivation	-10.028	6.695	1.116	-12.293	-7.762	-8.986	35	.001

- Sig. value is 0.001
- 0.001 > 0.05
- So null is rejected
- There is a significant different.

Heart Rate [Day 2]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre _Heartrate	82.50	36	11.946	1.991
	Post _Heartrate	90.78	36	10.661	1.777

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_Heartrate - Post_Heartrate	-8.278	16.251	2.708	-13.776	-2.779	-3.056	35	.004

- Sig. value is 0.004
- 0.004 < 0.05
- So null is rejected
- There is a significant different.

Blood Oxygen [Day 2]

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_SP02Blood_Oxygen	87.25	36	13.295	2.216
	Post_SP02Blood_Oxygen	97.86	36	.351	.058

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP02Blood_Oxygen - Post_SP02Blood_Oxygen	-10.611	13.417	2.236	-15.151	-6.071	-4.745	35	.000

- Sig. value is 0.001
- 0.001 < 0.05
- So Null hypothesis is rejected.
- There is a significant different.

CHANGE SCORES/OVERALL DIFFERENCE – INTRINSIC MOTIVATION

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Day1_intrinsic_motivation_changescores	3.39	36	9.439	1.573
	Day2_intrinsic_motivation_changescores	10.03	36	6.695	1.116

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Day1_intrinsic_motivation_changescores - Day2_intrinsic_motivation_changescores	-6.639	11.136	1.856	-10.407	-2.871	-3.577	35	.001

- Sig value = 0.001
- 0.001 < 0.05
- Null is rejected
- There is significant different.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Day1_sp02bloodoxygen_changescores - Day2_sp02bloodoxygen_changescores	-7.528	20.802	3.467	-14.566	-.489	-2.171	35	.037

CHANGE SCORES/OVERALL DIFFERENCE – BLOOD OXYGEN

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Day1_sp02bloodoxygen_changescores	3.08	36	13.739	2.290
	Day2_sp02bloodoxygen_changescores	10.61	36	13.417	2.236

- Sig. value is 0.037
- 0.037 < 0.05
- So Null hypothesis is rejected
- There is a significant different.

CHANGE SCORES/OVERALL DIFFERENCE – HEART RATE

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Day1_heartrate_change scores	9.31	36	18.314	3.052
	Day2_heartrate_change scores	8.28	36	16.251	2.708

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Day1_heartrate_changescores - Day2_heartrate_changescores	1.028	23.505	3.917	-6.925	8.981	.262	35	.795

- Sig. value is 0.795
- 0.795 < 0.05
- Null is fail to reject.
- There is no any significant different.

Results

1. Findings for Day One

During day one the training therapy focused significantly on laughter exercises rather than on breathing exercises. Pre- and post-tests that evaluated the participants' intrinsic motivation showed a significant difference between the two, showing that participants felt significantly more motivated after the laughter exercise were implemented. The significance level was 0.038, showing a high level of significance for this findings. The heart rate also showed a significant increase after the laughter exercises. The oxygen saturation did not show a significant increase.

For day one, the null hypothesis is rejected and it is accepted that laughter exercises allows the participants to increase their intrinsic motivation and heart rate, however, for the oxygen saturation, the hypothesis is not true.

It is important to note that breathing exercises were not focused on significantly during the first day, suggesting that the reason for the lack of change of oxygen saturation was related to this factors.

2. Findings for Day Two

For day 2, breathing exercises were focused on during the laughter exercises. The breathing played a bigger role for this session, and it was expected that this would be reflected in the results.

In relation to intrinsic motivation, the pre- and post-tests showed that there was a significant difference between levels of intrinsic motivation before and after the exercises. The significance was at 0.001 level, so it was significantly higher.

The heart rate difference on the second day was also significant. This showed that there was an important change in the heart rate during the second day session as well as during the first one.

An important difference between day two and day one was that on day two there were significant differences in the oxygen saturation. The oxygen saturation after the intervention was significantly higher than before the intervention. Considering that more attention was given to breathing and guided relaxation for this day, it could be said that this was the reason for the change.

3. Day One and Day Two Analyses

After analyzing each day individually, the results were analyzed together for consideration of Hypothesis 3. Intrinsic motivation was shown to improve significantly over two days. It improved on both individually and overall. The heart rate increased, showing that the participants experienced a positive effect. In terms of oxygen saturation, this only occurred when breathing was focused on specifically.

Intrinsic motivation improved more on the second session, and it seems likely that it would improve more with future sessions, looking at the dynamic of the changes. It seems likely that oxygen levels could have continued to improve with more sessions, considering that the breathing is focused on in these follow-up sessions. As for heart rate, it would seem that the laughter exercises could be similar in effect to physical exercises, however, it would appear that heart rate would improve only for the duration of the intervention, which could be beneficial for other aspects, however, in terms of laughter exercises the sessions would work mostly equally and might not have a cumulative effects. The sessions could be beneficial, but each session would have the same benefits, as it seems unlikely that heart rate would improve significantly if more sessions. In short, for heart rate, each individual sessions is beneficial, but doing more sessions would not make each session more and more beneficial, as could be the case with intrinsic motivation and oxygen saturation.

Discussion

The findings for this study are in line with previous research in the sense that they show a positive effect associated with laughter. It also confirms the idea that laughter therapy is a viable solution for the workplace, allowing to make an improvement when the therapy is conducted in a series consisting of two days that included 3 and 6 laughter exercises.

The findings have shown a positive link between laughter exercises and intrinsic motivation. This can be linked to previous research on laughter therapy, for instance, that it was able to reduce stress or improve other variables that could have connected to the motivational aspect indirectly or directly. The study does not provide enough information on this aspect and it is possible to consider that other variables, like stress, satisfaction or others, have intervened in the link. However, what the study does show is that laughter exercises would have a positive effect on intrinsic motivation at work, which suggests that they could be a viable therapeutic activity for the workplace to boost this aspect. This is concerning the psychological aspect of the psycho-physiological phenomenon of laughter.

On the physiological side, it was seen that laughter exercises could have a positive effect on the individual's heart rate and breathing, however, they only affected breathing when breathing was a focus of the exercises. This would suggest that laughter exercises combined with breathing exercises could provide a cardiopulmonary workout in the workplace that would boost the individual's heart rate and increase oxygen in the blood.

In general, the study would suggest that laughter exercises in the workplace are a viable strategy to provide a short cardiopulmonary workout for optimal functionality and to increase intrinsic motivation at work. It seems likely that other benefits could be obtained through this strategy, but this merits further inquiry.

1. Limitations

There were several significant limitations of the study. Firstly, it was done with a small sample, so the results cannot be generalized to a very broad population. However, the results do suggest that future research in this direction could be done.

Another limitation was the time of the study. The study took two days, so it is possible that there would have been significant changes in the dynamic after a longer period of time or that the benefits would appear stronger.

A third limitation is that the study did not control for other variables in relation to intrinsic motivation. Stress, for example could have played a mediating role between the two, however, the study focused on the other variables.

Another limitation was the inclusion of the breathing exercises. It might have been interesting to consider if laughter exercises done over time could improve a person's oxygen levels or if breathing exercises appear necessary to achieve this result.

A significant consideration was that the research was a part of the Singapore Laughter Yoga and Maximum Wellness, provided by Van Ram, a Laughter Therapist. The workshop was sponsored by the Multinational Project Engineering Management Company, that was seeking to promote workplace health. The employees were encouraged to attend the workshop as a company-sponsored activity. This could affect the results. It is important to state that the measurements were done independently, however, although it was voluntary sign ups to the activity, individuals would have different initial motivations for participation.

2. Future Research

Going by the findings of this study, several future research directions can be proposed. Firstly, it may be relevant to do studies in a similar vein to the present study, but include a bigger population and consider more the demographic characteristics of the individuals. For instance, it may be relevant to see if there are gender differences in the effectiveness of laughter exercises or if people over a certain age benefit more from it, for example. Similar studies could also be done over a longer period of time, for instance, over a week or two weeks. A follow-up study

could also show if the effects of laughter exercises apply only on the short-term, with the implication that laughter exercises need to be repeated and consistently encouraged, if they lose their effectiveness with practice, suggesting it only as a short-term viable intervention

Another direction of research would be to examine the variables that might moderate the link between laughter and intrinsic motivation. It is possible to consider that other variables could influence this relationship, these variables being stress relief, increased well-being and others that research has linked to intrinsic motivation.

Another research direction would involve focusing simply on the laughter exercises without including the breathing exercises and consider if over a long or short time this affects oxygen level.

A more practical research direction would be to see how laughter exercises can be implemented more efficiently in the workplace and how they can be applied in other settings, for instance, educational institutions. It would also be useful to find other positive effects that laughter can have in the workplace when implemented in this manner.

Conclusion

Laughter exercises seem to be an effective strategy to immediately increase intrinsic motivation in a workplace. They also seem to offer a good cardio workout, however, seem to be less effective on their own for changing oxygen levels in the blood.

Laughter exercises appear to be a promising strategy for increasing motivation and other aspects. It seems to be a potentially cost-effective and useful strategy that can be applied in a variety of settings and that can promote different positive aspects.

While the study had some limitations, the main finding was that Laughter therapy could influence intrinsic motivation at work in a very short period of time, showing significant improvements in this variable after a short therapeutic training. It would be important to examine laughter exercises in the workplace to see how their correlation with intrinsic motivation appears, which factors might mediate it and other positive effects that could be

obtained by implementing laughter exercises in the workplace. Further guidelines for applying this strategy could also be developed and can be used as an effective tool to intrinsically motivation employees long-term.

Word Count; 6,548

Excluding; titles, abstract, tables, references and appendix

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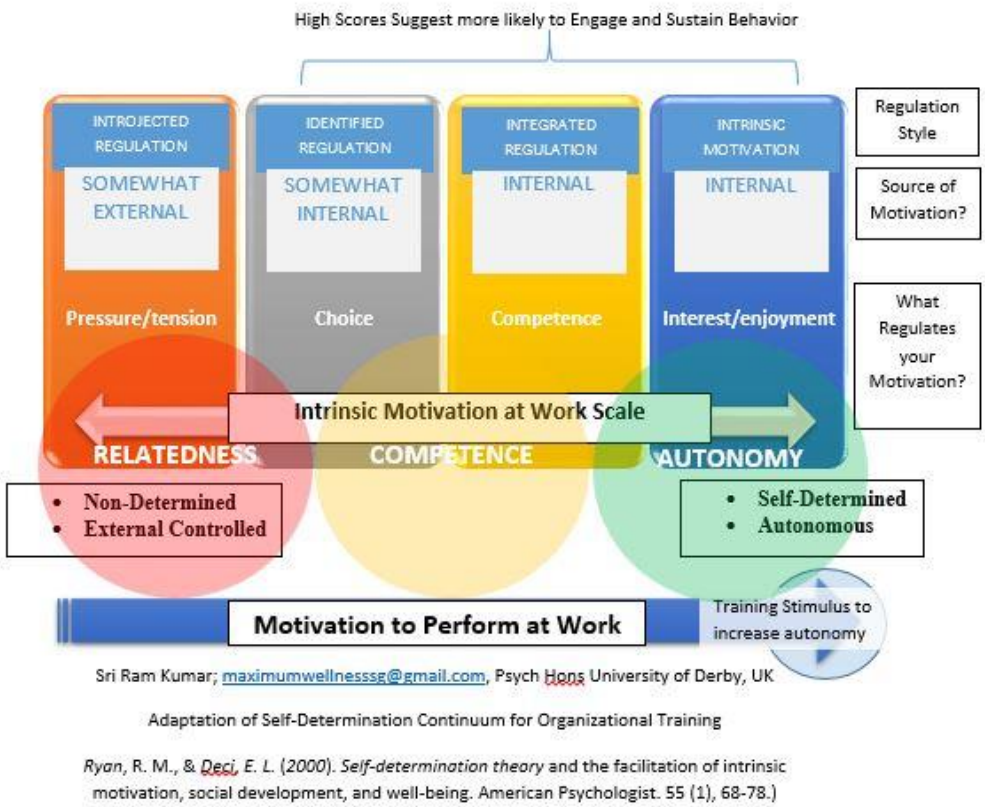
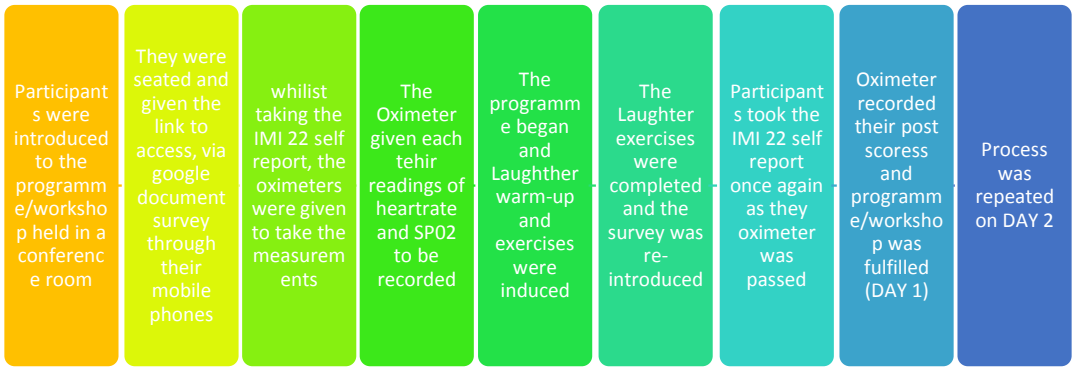
Appendix

ANNEX A



ANNEX B

The Procedure



ANNEX C

Age	Target HR zone 50-85%	Average maximum heart rate, 100%
20 years	100-170 beats per minute	200 beats per minute
30 years	95-162 beats per minute	190 beats per minute
35 years	93-157 beats per minute	185 beats per minute
40 years	90-153 beats per minute	180 beats per minute
45 years	88-149 beats per minute	175 beats per minute
50 years	85-145 beats per minute	170 beats per minute
55 years	83-140 beats per minute	165 beats per minute
60 years	80-136 beats per minute	160 beats per minute
65 years	78-132 beats per minute	155 beats per minute
70 years	75-128 beats per minute	150 beats per minute

The American Cancer Society uses similar recommendations on target heart rates through exercise

ANNEX D

ADAPTED INTRINSIC MOTIVATION INVENTORY SCALE QUESTIONNAIRE

This is a research from Singapore Laughter Yoga and, University of Derby. We are requesting your participation in a research study titled "Singapore laughter therapy and effects on motivation at work".

The purpose of this study is to examine the relationship between frequency of laughter and intrinsic motivation in the workplace. An understanding of the factor influencing intrinsic motivation in the workplace has the potential to shed light on the positive effects of laughter therapy. The study may also help therapist to develop more concrete and effective instructional practices and environments facilitating their laughter therapy.

Consent:
I agree to participate in the study entitled "Singapore Laughter Therapy and effects on motivation at work" conducted through Singapore Laughter Yoga and University of Derby. I have read and retained a copy of the Letter of Information and the purpose of the study is explained to my satisfaction.
I have had any questions answered to my satisfaction.
I understand that, upon request, I may have a full description of the results of the study after its completion.
I understand that the researchers intend to publish the findings of the study.

I HAVE READ AND UNDERSTOOD THIS CONSENT FORM AND I AGREE TO PARTICIPATE IN THE STUDY

For each of the following statements, please indicate how true it is for you, using the following scale where 1 is not at all and 7 is very: 1 2 3 4 5 6 7

1. While doing my work I was thinking about how much I enjoyed it.

Not at all 1 2 3 4 5 6 7 Very

2. I did not feel at all nervous about doing my work.

Not at all 1 2 3 4 5 6 7 Very

3. I felt that it was my choice to do my work.

Not at all 1 2 3 4 5 6 7 Very

4. I think I am pretty good at my work.

Not at all 1 2 3 4 5 6 7 Very

5. I found my work very interesting.

Not at all 1 2 3 4 5 6 7 Very

6. I felt tense while doing my work.

Not at all 1 2 3 4 5 6 7 Very

7. I think I did pretty well at my work, compared to other colleagues.

Not at all 1 2 3 4 5 6 7 Very

8. Doing my work is fun.

Not at all 1 2 3 4 5 6 7 Very

9. I felt relaxed while doing my work.

Not at all 1 2 3 4 5 6 7 Very

10. I enjoy doing my work very much.

Not at all 1 2 3 4 5 6 7 Very

11. I didn't really have a choice about doing my work.

Not at all 1 2 3 4 5 6 7 Very

12. I am satisfied with my performance in my work.

Not at all 1 2 3 4 5 6 7 Very

13. I was anxious while doing my work.

Not at all 1 2 3 4 5 6 7 Very

14. I think my work is very boring.

Not at all 1 2 3 4 5 6 7 Very

15. I felt like I was doing what I wanted to do while doing my work.

Not at all 1 2 3 4 5 6 7 Very

16. I felt pretty skilled at my work.

Not at all 1 2 3 4 5 6 7 Very

17. I think my work is very interesting.

Not at all 1 2 3 4 5 6 7 Very

18. I felt pressured while doing my work.

Not at all 1 2 3 4 5 6 7 Very

19. I felt like I had to do my work.

Not at all 1 2 3 4 5 6 7 Very

20. I would describe my work as very enjoyable.

Not at all 1 2 3 4 5 6 7 Very

21. I did my work because I had no choice.

Not at all 1 2 3 4 5 6 7 Very

22. After doing my work for awhile, I felt pretty competent.

Not at all 1 2 3 4 5 6 7 Very

Scoring information. The item responses for items 2, 9, 11, 14, 19, 21 need to be reversed, so the

item response needs to be subtracted from 8. To calculate a subscale score, the responses for a subscale need to be averaged.

Interest/enjoyment: 1, 5, 8, 10, 14(R), 17, 20

Perceived competence: 4, 7, 12, 16, 22

Perceived choice: 3, 11(R), 15, 19(R), 21(R)

Pressure/tension: 2(R), 6, 9(R), 13, 18

ANNEX E

Table for determining (with 95 percent certainty) the random sample size from a determined population

Population	Sample	Population	Sample	Population	Sample	Population	Sample
10	10	150	108	460	210	2,200	327
15	14	160	113	480	214	2,400	331
20	19	170	118	500	217	2,600	335
25	24	180	123	550	226	2,800	338
30	28	190	127	600	234	3,000	341
35	32	200	132	650	242	3,500	346
40	36	210	136	700	248	4,000	351
45	40	220	140	750	254	4,500	354
50	44	230	144	800	260	5,000	357
55	48	240	148	850	265	6,000	361
60	52	250	152	900	269	7,000	364
65	56	260	155	950	274	8,000	367
70	59	270	159	1000	278	9,000	368
75	63	280	162	1,100	285	10,000	370
80	66	290	165	1,200	291	15,000	375
85	70	300	169	1,300	297	20,000	377
90	73	320	175	1,400	302	30,000	379
95	76	340	181	1,500	306	40,000	380
100	80	360	186	1,600	310	50,000	381
110	86	380	191	1,700	313	75,000	382
120	92	400	196	1,800	317	1,000,000	384
130	97	420	201	1,900	320		
140	103	440	205	2,000	322		

Source: Krejcie, R.V., & Morgan, D.W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*, 607-610.

ANNEX F

GUIDELINES ON PARTICIPANT

INFORMATION SHEET & CONSENT FORM

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1. **Therapeutic Effects of Laughter Exercises on Intrinsic Motivation at work**

2. **Principal Investigator and co-investigator(s), if any, with the contact number and organization: Singapore laughter yoga, university of derby**

3. **What is the purpose of this research?** You are invited to participate in a research study. This information sheet provides you with information about the research. The Principal Investigator (Van Ram) or his/her representative will also describe this research to you and answer all of your questions. Read the information below and ask questions about anything you don't understand before deciding whether or not to take part.

4. **Who can participate in the research? What is the expected duration of my participation? What is the duration of this research?**

   Employees and of the corporation, male and female, age above 18 years

5. **What is the approximate number of participants involved?**
   40

6. **What will be done if I take part in this research?**
   Laughter exerices, An oximeter reading and intrinsic motivations survey

7. **If biological samples are taken, what will be done with my samples?**
   accelerated heartrate, and blood oxygen saturation

   To protect your confidentiality, your *data* will be coded. All identifiable information (e.g. names, IC nos.) will be kept separate from the *data*. The link between your

identifiable information and the code number will be kept confidential by the principal investigator or a trusted third party.

8. How will my privacy and the confidentiality of my research records be protected?

Only the principal investigator has your identifiable information (e.g. names, contact information, IC nos.) and this will not be released to any other person, including members of the research team. Identifiable information will never be used in a publication or presentation. All your identifiable health information and research data will be coded at the earliest possible stage of the research.

All data collected will be kept in accordance to the University's Research Data Management Policy. Research data used in publication will be kept for a minimum of 10 years before being discarded.

Your identifiable information (e.g. names, IC nos.) will not be released, unless required by common law).

9. What are the possible discomforts and risks for participants?

nil

10. What is the compensation for any injury?

If you follow the directions of the PI in charge of this research and you are physically injured in spite of the procedure given under the plan for this research, the *[university of derby, uk]* will not pay the medical expenses for the treatment of that injury. Payment for management of the normally expected consequences of your treatment will not be provided by the *[university of derby, uk]*. By acknowledgement in this consent form, you will not waive any of your legal rights or release the parties involved in this study from liability for negligence.

11. Will there be reimbursement for participation?

nil

12. What are the possible benefits to me and to others?

There is no direct benefit to you by participating in this research. The knowledge gained may benefit the public in the future.

13. Can I refuse to participate in this research?

Yes, you can. Your decision to participate in this research is voluntary and completely up to you. You can also withdraw from the research at any time without giving any reasons, by informing the principal investigator and all your *data* collected will be discarded.

You are entitled to refuse to participate or discontinue participation at any time in this research. Refusal to participate or withdrawal from participation will not affect your medical management or cause loss of benefits to which you are otherwise entitled.

14. Whom should I call if I have any questions or problems?

Please contact the Principal Investigator, [Van Ram] at telephone (____6592255263___ and email ____wellnessmaximum@gmail.com____) for all research-related matters and in the event of research-related injuries.

For an independent opinion regarding the research and the rights of research participants, you may contact a staff member of the University of derby, Singapore (Attn: Dr. Keith , K.J.Clements@derby.ac.uk).

Consent Form

Project title: Therapeutic Effects of Laughter Therapy on Intrinsic Motivation and Psychophysiology at work

Principal Investigator with the contact number and organization:

(Van Ram) Maximum Wellness

I hereby acknowledge that:

1. My signature is my acknowledgement that I have agreed to take part in the above research.

2. I have received a pamphlet (or a copy of this information sheet) that explains the use of my *data* in this research. I understand its contents and agree to donate my *data* for the use of this research.

3. I can withdraw from the research at any point of time by informing the Principal Investigator and all *my data* will be discarded.

4. I will not have any financial benefits that result from the commercial development of this research.

5. I *agree* to be re-contacted for future related studies. I understand that future studies will be subject to an Institutional Review Board's approval.

** This research has been explained to me in _____ (state language), which I understand, by _____ (name of translator) on _____ (date).

_____ _____

Name and Signature (Participant) Date

_____ _____

Name and Signature (Consent Taker) Date

_____ _____

** Name and Signature (Translator) Date