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CONTAGIOUS YAWNING AMONG UNIVERSITY STUDENTS

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Abstract

The purpose of this study was to examine the differences in the frequency of contagious yawning based on two aspects i.e. gender, social bond, and level of empathy measured by using Interpersonal Reactivity Index score. This study was conducted among University Malaysia Sabah students with 64 participants (male = 32, female = 32). The tools used include the Interpersonal Reactivity Index (IRI) used to measure empathy and a video that stimulate the yawn. The results summary shows that there is no difference in frequency for both gender and social bond. Meanwhile, empathy score prior to treatment and after treatment did not reveal any statistically significant outcome. Data was analysed by Mann-Whitney test and Paired samples t-test. The study found that both sexes, men and women have a sense of empathy within themselves. Limitations and other factors affecting human contagious behaviour are also discussed for future research purposes.

Keywords: *Contagious Yawning, Empathy, Social Bond, Interpersonal Reactivity Index, Student.*

INTRODUCTION

Generally, decreasing in oxygen level is triggering the yawn, and it is thought to remove bad air from the lungs and increase oxygen circulation in the brain [27]. It has also been suggested that yawn is a way of cooling human beings' brain, to avoid the brain overheating. Despite that brain is more likely to overheat when a person is worn out, so this is why yawn occurred. If this is the causes of yawning, then why is it that when we see someone yawn, we react like them. Studies of contagious yawning have attracted the most attention in recent years. Contagious yawning, in which observation of another's yawn induces yawning behaviour in the observer, is a well-documented phenomenon. In humans, contagious yawning can be elicited by viewing or hearing others' yawning or imagining yawning [5, 13, 15, 21, 22, 23]. Contagious yawning is a vastly known and mysterious phenomenon, as we all have experienced it before. The contagion yawn is a cross-species phenomenon which have been tried out on normal human, clinical population and primates. Several neuroimaging studies have been conducted to investigate the cortical and subcortical structures relevant to the contagious yawning [6, 7, 25, 26], but the results are inconsistent. This is possibly due to differences in the yawning stimuli and/or control stimuli used for recording [7]. Thus, there are many theories have been put into practice, some researcher stated that contagious yawning has to do with empathy. However, some others say it is an automatic mimicry because of neurological stimulation [19]. Besides, by hearing and reading it can provoke yawn to take place. This study is needed because there was various method that have been used and inconsistency in data analysis which root to invalid of end results.

Apart from that, the constant number of participants is a main issued that have to be fix in current or future studies. Hence, a new penetration could be found along the studies. This then, clear up the mysterious of contagion yawn. Indeed, this research is about contagious yawning, which the word contagious is though as infection diseases, through direct or indirect contact, a

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healthy individual becomes sick through the transmission of a virus. However, this research is not a virus that been mentioned on medical terms. We are using on psychological terms contagion or contagious. It has been defining in various meaning, but the clearest and most inclusive definitions of it is the spread of affect or behaviour from one crowd participant to another, one person serves as the stimulus for the imitative actions of another [17]. Therefore, contagious yawn is a yawn that trigger by certain stimulus either by smell, sight or hearing. It does not focus only on normal human being but as well as gifted people with autism [32], schizophrenia [14] and psychopath [24]. With in mind, yawning is not really a "joining in" because we are not copying the yawn on any conscious level. Some people with mental illness does not exhibit a yawn contagion response. This has led to a variety of theories about yawning relationship to empathy, non-conscious mimicry and the brain's mirror neuron system [19]. This idea of mirror neuron system deficits might lead to shortage of empathic cues that trigger contagious yawning.

Briefly, empathy is the ability to understand and share the feelings of another. Other studies by [18] proved that specific activation in a variety of other brain areas that have been linked to empathy-related, in essence the right posterior superior temporal sulcus (STS) and bilaterally in the anterior STS [28], the posterior cingulate and precuneus [19] and the right posterior inferior frontal gyrus [1]. The neurological components linked with empathy may perform different functions when activated alone compared to when the system operates as a whole [3]. In short, the activation of one single brain area may result in multiple behavioural pattern [16]. Most of the studies conducted are related to empathy, chameleon effect and non-conscious mimicry, so researchers conduct a research regarding differences in contagious yawning between men and women. Typically, in their research on contagious yawning they used to use stimulus such as video clips as it shown a significant outcome that women are higher on empathic abilities. Plus, yawn contagion was primarily driven by emotional closeness between individual and not by other variables such as nationality and sex. The degree of closeness was arranged follows a pattern of kin, close friends, acquaintances and strangers [4]. The level of empathy was evaluated by Interpersonal Reactivity Index (IRI). The studies found that age was only able to explain 8% of the variability in the infectious yawn response. Therefore, the aims of this study is to assess participants' level of empathy using the IRI. In particular, this study also aims to examine the frequency of yawning that occurred during treatment while implementation of the stimuli.

METHODOLOGY

a) Research design

In this study, quasi experimental design was applied through the research conducted. It includes the pre-post design and repeated design. In a pre-test and post-test design, the dependent variable is measured once before the treatment is implemented and once after it is implemented using an empathy questionnaire [14, 2, 10].

b) Sample

A group of university's students are involved in this research and it compose of 32 pairs which is 16 pairs that knowing each other (first treatment) and another 16 pairs are not knowing each other (second treatment). This female-to-male ratio reflected equal representation of females and males. The subjects (n=64) had an average age in range 18 to 54 years old.

c) Location

It was conducted in Individual Counselling Laboratory at level ground floor, Faculty of Psychology and Education, University Malaysia Sabah (UMS).

d) Instruments

A computer monitor was used to present stimuli in order to simplify subjects and researcher. In this study, researcher shown a video of person yawning, laughing and neutral to the participants. The duration of video is within 15 minutes. In order to identify the contagious yawning among university students, we distributed a set of questionnaires to the participants. In this study, we used the instrument of Interpersonal Reactivity Index (IRI) to measure the contagious yawning of

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participants. It contained four subscales, which is 28 items in the questionnaire. Every subscale has seven different items. This instrumented also used a five points Likert scale. It ranging from "Does not describe me well" to "Describe me very well". All the questionnaires are answered by participants before and after treatment given.

e) Data analysis

Statistical analyses were performed using SPSS for Mac, version 24.0. Nonparametric inferential statistic and inferential statistic are used to analyse the data. Nonparametric and inferential statistic that can be used in this research study are Mann-Whitney test and Paired sample t-test. Gender and social bond are a categorical variable, so we used Mann-Whitney test to assess the outcome.

RESULTS AND DISCUSSIONS

Outcome of the first hypothesis (H_1) revealed that there were no significant differences in yawning rates among male and female $Z = -1.620$, $k > .05$. This means, contagion yawning experienced by men and women were the same since the mean did not show outstanding difference. Consequently, the first hypothesis is rejected. The result is presented in table 1 as shown below.

Table 1:
Frequency of Yawning Between Male and Female by using Mann-Whitney Test

Male mean rank	Female mean rank	U	Z	p
28.94	36.06	398.00	-1.62	0.105

Rate of contagious yawning were found to not have an obvious difference for both male and female. This finding is important for filling the gap in the literature between gender differences and contagion yawn. The available evidence on contagious yawning in humans shows that there is no difference between men and women. Researchers [9] had identified a total of 15 other publications that included 17 study samples that have addressed this uncertainty, and all report no effect of sex in terms of the susceptibility to contagious yawning and/or the frequency of contagious yawning. Previous research has been widely reported that gender differences in the empathic abilities, with women showing higher empathy levels than men [29]. Such differences should reflect in dissimilar yawn contagion levels of the two sexes. The proposition between strangers and closeness is rejected due to the end result that revealed negative differences among variables. Therefore, $Z = -.043$, $k > .05$. The result is presented in table 2 as shown below.

Table 2:
Frequency of Yawning Between Stranger and Friend by using Mann-Whitney Test

Stranger mean rank	Friend mean rank	U	Z	p
32.59	32.41	509.00	-0.04	0.966

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Contagion is greater between familiar individuals, though it follows an empathic gradient [20], escalating from strangers to kin. Despite that, [18] on his research do not declare whether contagious yawning on familiar individual actually leads to the coexist of behavior. Empathy plays a leading role in this phenomenon just when social bond in shaping contagious yawn being exhibited. Further to the previous literature clinical, psychological, and neurobiological demonstrated that the social bond is associated with empathy [20] which affect the human yawn in terms of frequency, occurrence and latency. A complex network of brain region connected to empathy, motor imitation and social behavior likely to trigger off when respondent noticing others yawned, which also covers limbic and para-limbic structures [31, 11]. Specifically revealed by [1] the right posterior inferior frontal gyrus is activated following the sound of a yawn, as the sight of someone yawning. This was effective at eliciting an urge to yawn. There is no significant difference in pre test IRI score with post test IRI score, t (63) = -0.818, k > 0.05. Based on the mean of paired sample statistics table, mean and standard deviation of empathy instrument post (Mean = 92.20, S.D. = 8.07) are higher after the treatment compared to pre-instrument mean (Mean = 91.16, S.D. = 8.21). The result is shown in table 3 as below.

Table 3:
Interpersonal Reactivity Index Result Before and After Treatment by using T-Test and Descriptive Statistic

Before treatment (*N*=64)		**After treatment (*N*=64)**		**95% CI (Mean Difference)**			
M	**SD**	**M**	**SD**		**r**	**t**	**df**
91.16	8.21	92.20	8.07	-3.60,1.51	0.42	-0.82	63

This finding seems to correspond to some of the research looking at empathic abilities using questionnaire prior to a brief contagious yawning video stimulus, including [2] finding that IRI scores are reliably noticed after treatment even if they occur in an unattended or attended channel. The current study also supports the commonly held view by [10] stated that the frequency of contagious yawning being exposed did not predict the score of the four dimensions of empathy according to IRI. Consequently, our study revealed that stimuli has not given any implication on IRI outcome.

CONCLUSION

As a result of the study of contagious yawning between male and female as well as strangers and friends. Also difference on IRI score, before and after treatment. This study showed some inconsistences to previous literature on this topic as all the hypotheses were rejected. The IRI scale was used in order to measure level of empathy. A total of participants (*N*= 64) took part in the study. However, some research on this purpose produce a same result, there is still numerous areas in this topic to be discussed. Also, we can see that everyone has a sense of empathy within them regardless female or male. Finding out the contagious yawning in relation to empathy is very beneficial particularly in clinical psychology field as it will help us in seeking the causes and learn new things regarding neuroimaging. It will also enable individuals to have better understanding of themselves.

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