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The Impact of Vegan and Other Plant-Based Diets on Memory and Mood

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Abstract

Studies suggest that brain function is associated with diet via the gut microbiome's biological mechanism that communicates with the brain in a bidirectional manner. Additionally, the modern western diet has been linked to adverse effects on hippocampal memory and mental well-being. Contrastingly, plant-based diets have been associated with microbial changes that positively affect mental function. However, research done on the recently popularised vegan diets remains scarce. Therefore, this study investigates whether differences in the type of diet, ranging from meat-based, pescatarian and vegetarian diets to vegan diet, influence mood and memory. It was hypothesized that there would be a significant difference between the memory scores of omnivores and vegans. In addition, vegans will have the lowest scores on sadness, anxiety and depression as mood assessing parameters. A total of 168 (122 females, 43 males and three others) participants, categorized based on their diet, were asked to complete the DASS21 questionnaire to assess mood and the Digit Span Test (DST) to assess working memory via an online questionnaire. The results revealed that the type of diet had significant effects on both memory and mood. In addition, vegans scored the highest on memory as assessed by the Digit Span Task and lowest on sadness, anxiety, and depression as mood components. These results show that adherence to predominantly vegan dietary patterns has a considerably positive effect on memory and mood.

Keywords: vegan, memory, mood, diet, cognition

1. Introduction

The importance of our food choices has been communicated over decades. Although the fundamental function of food is to provide us energy through nutrients, recently, it has become more than that. People turn to food for many other reasons, such as entertainment, culture,

experience, or mood lifter (Tomiyama et al., 2015). Food is, therefore, something that affects our lives extensively.

It has become increasingly evident in recent years that the western diet, which is characterized by a hectic lifestyle, easy accessibility of highly processed food, and comfort food for mood-boosting, has a negative physiological effect on human bodies and might lead to obesity, cardiovascular problems, or diabetes (Noble et al.,

2016; Noble et al., 2017; Cummings et al., 2018; Firth et al., 2020). On the other hand, the effects of food on human mental well-being are communicated far less. Nevertheless, a relationship between diet and mental health has been gaining significant interest. Nutrition not only has a direct impact on our mood (Kroes et al., 2014; Wahl et al., 2017) but, according to recent findings, it can have a direct effect on people's brain and promote cognitive dysfunction (Gómez-Pinilla, 2008; Kanoski & Davidson, 2011; Baym et al., 2014; Davidson et al., 2014; Noble et al., 2017; Mohajeri et al., 2018). Although the nature of these relations is complex, recent evidence suggests that gut bacteria play a mediating role between diet, memory and mood (David et al., 2014; Noble et al., 2017; Medawar et al., 2019; Firth et al., 2020). Therefore, it is hypothesized that vegan and other plant-based diets positively affect memory and mood (García et al., 2018; Wu et al., 2019; Ramey, 2020; Corley et al., 2020).

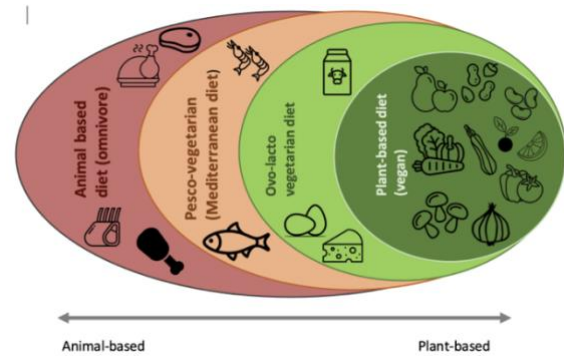
2. Literature Review

2.1 Diet Spectrum and Effects

Although meat, highly processed food, and fast food are part of western dietary patterns, there is an increasing trend of moving towards fully or partially plant-based (vegetarian or vegan, see Figure 1), fresh and local food across various countries such as the UK, the US, and Germany (Medawar et al., 2019). Numerous studies have found that a diet that is rich in fruits, vegetables, nuts, legumes, and Omega-3 benefits the human body and supports cognitive processes (Gómez-Pinilla, 2008; Eichelmann et al., 2016; Wahl et al., 2017; Alasmre & Alotaibi, 2020; Ramey et al., 2020). Furthermore, green leafy vegetables and low intake of red meat are associated with staying mentally sharp in later life; a processed food diet has been identified with poorer cognitive function.

Figure 1

The Spectrum of Diets Based on Their Animal or Non-animal Origin



2.2 Brain and Gut Microbiome

Numerous recent studies suggest that the brain-gut connection provides an explanation for the impact of diet on cognition and mood (Agranoff, 2008; Noble et al., 2017; Mohajeri et al., 2018; Smith & Scholey, 2014; Firth et al., 2020; Tomova et al., 2019; Jia et al., 2020). According to Noble et al. (2017), not only long term but also short-term consumption, which is high in refined sugar and animal fat, distinctive for western diet, has a proven negative effect associated with "impaired hippocampal-dependent learning and memory function" (p.2). Although the western diet is connected to obesity and obesity is linked to reduced hippocampal function, the diet itself has shown to correlate with hippocampal function independent of obesity.

It has long been suspected that the effect is connected to the gut microbiome. The gut microbiome consists of approximately 100 trillion microorganisms such as bacteria, viruses, and archaea active in the human gut. The microbiome is directly connected to human cognitive functions and emotional behaviour (Rogers, 2001; Noble et al., 2017; Mohajeri et al., 2018; Firth et al., 2020). The brain-gut axis facilitates gut microbes to communicate with the brain and vice versa. Due to the biological possibility

of taxonomic variability within the gut microbiome, even short-term change from an animal-based diet to a plant-based diet can dramatically impact the structures of the microbial community (Noble et al., 2017; Mohajeri et al., 2018;). A recent study by Dinan et al. (2018) confirms that the gut microbiome helps regulate and release neurotransmitters. *Lactobacillus* and *Bifidobacterium* species make gamma-aminobutyric acid (GABA), *Escherichia*, *Bacillus* and *Saccharomyces* spp. create noradrenaline, *Candida*, *Streptococcus*, *Escherichia* and *Enterococcus* spp. can produce 5-HT, *Bacillus* produce dopamine, and *Lactobacillus* can produce acetylcholine. Substantial human and animal research confirm the involvement of the gut microbiota in cognition. While studies on rodents and humans suggest cognitive dysfunction is caused by western diet via altering levels of gut bacteria (Gómez-Pinilla, 2008; Proctor et al., 2017; Noble et al., 2017; Mohajeri et al., 2018), several other findings propose Mediterranean (predominantly plant-based with occasional animal products) and plant-based diet to optimize brain function and avoid cognitive decline. (García et al., 2018; Wu et al., 2019; Ramey, 2020; Corley et al., 2020).

2.3 (Un)healthy Food that Affects our Mood

It is common to turn to sugary, highly processed, and fatty food for mood-boosting effect, yet various clinical studies have confirmed that refined carbohydrates increase depressive symptoms (Salari-Moghaddam et al., 2019; Firth et al., 2020). Food that is high in animal fat, typical for the western diet, is high in arachidonic acid. Beezhold and Johnston (2015) point out that arachidonic acid might promote mood disturbance through a negative impact on the brain and dietary inflammation. Contrastingly, a diet high in fibre (found in fruit and vegetable), unsaturated fatty acids (found in nuts, avocado, olives, and seeds) and polyphenols (found in berries, nuts, and vegetables) helps gut microbial taxa and turns these into anti-inflammatory

metabolites that can considerably decrease depressive symptoms (Okereke et al., 2012; Noble et al., 2017; Yeomans, 2017; Firth et al., 2018; Lassale et al., 2019; Firth et al., 2020). Substantial research indicates that a restricted amount of meat, fish, dairy, and poultry that is replaced by whole food plant-based vegan diet leads to enhanced mood (Agarwal et al., 2015; Beezhold & Johnston, 2015).

2.4 Effects of Dietary Components on Memory Function

Nevertheless, a balanced healthy diet is a long-term investment in future well-being. Numerous studies have demonstrated that a plant-based diet has immediate effects on various cognitive tasks, such as learning and memory processes (García et al., 2018; Wu et al., 2019; Ramey, 2020; Corley et al., 2020). Furthermore, various studies confirmed that consumption of food high in saturated fat is connected to neuroinflammation of the blood-brain barrier and altered levels of BDNF2 connected to a short-term memory impairment (Yeomans, 2017), while diet, which includes luteolin and GLP-1, has the opposite effect. Luteolin, a flavonoid compound found in many plants, including celery, peppers, carrots, olive oil, peppermint, and chamomile, reduces age-related inflammation and related memory deficits by directly inhibiting the release of inflammatory molecules in the brain (Jang et al., 2010). Additionally, GLP-1, which is found in “high-fibre grain products, nuts, avocados” (Bodnaruc et al., 2016, p.1), is associated with enhanced memory function (Brinkworth et al., 2009). Since fibrous grain products and nuts are key components of most plant-based diets, it can be inferred that plant-based diets potentially contribute towards a better memory.

3. Methodology

3.1 Participants

Respondents ($N = 168$) included 122 females, 43 males and three other, from which 50% of participants were vegan, 29.2% omnivorous, 14.3% vegetarian and 6.5% pescatarian. The age group with the highest number of respondents was 18-25, comprising 70 respondents.

The study was conducted entirely online, mainly shared amongst various Facebook groups related to diet and lifestyle. This means that the sample selected for the study was voluntary response sampling, as the participants were not directly contacted, but instead, they volunteered when encountering the survey in one of these groups. Convenience sampling was used as well, as each researcher shared the questionnaires amongst their acquaintances, which may have resulted in a slight snowball sampling.

3.2 Materials

Data collection included a questionnaire on diet, mood and memory. Participants were asked to complete a questionnaire, firstly including sociodemographic questions and questions about their daily diet, with additional questions asked for details.

3.2.1 Depression, Anxiety and Stress Scale-21

The depression followed dietary questions, Anxiety and Stress Scale-21 (DASS 21), which was used in order to link diet to mood, as it aims to define the participant's overall mood by asking about the feelings experienced during the past week. The scale uses questions such as "I tended to over-react to situations", with answers ranging from (0) "Does not apply at all." to (3) "Applies very much." The participants were then assessed on three self-report scales; Depression, Anxiety and Stress.

DASS 21 has been shown to be a reliable psychometric instrument, as using the Cronbach alpha values determined

the DASS-21 to have a good internal consistency as well (Coker et al., 2018). This means that the results in memory and mood can be presumed to be accurate.

3.2.2 Digit Span Test

In the next step, participants were to complete a Digit Span Test (DST) as a part of the questionnaire. The DST examines individuals' cognitive abilities, specifically working memory, by displaying a list of items, which are repeated back immediately after. Furthermore, it establishes the individual's memory span by elongating the list after each successful try. The data on working memory was examined to observe the relationship between diet, mood and memory.

To ensure the data is valid, the data of each participant was collected through the DST itself. This guarantees that any cheating on the questionnaire would be amended. We were able to connect the DST data folder to the questionnaire with the use of timestamps and a specific four-digit code selected by each individual. By downloading the DST results of each participant, we could ensure that the DST data was genuinely accurate and that no individual enhanced their results.

3.3 Procedure

Surveys were shared amongst various Facebook groups, with the common topic of diet or lifestyle. Individuals volunteered to participate and fill in a survey including sociodemographic questions, questions on diet and the DASS 21 to assess their overall mood. To link diet to memory, participants were asked to undergo a test of their working memory, the DST. The DST results were linked to the mood score and diet to establish a significant difference between vegan and non-vegan scores in mood and memory. To observe this significant difference, a multiple ANOVA test was run in the case of diet and mood (sadness, anxiety and depression scores) and a one-way

between-subjects ANOVA was run to examine the impact of diet on memory.

3.4 Ethical Considerations and Limitations

Participants were asked to sign an informed consent form, in which they are able to learn the basic outline and information on the research. They were not subjected to any danger but were warned of potential uneasiness while responding to personal questions and questions related to their mood. The data is anonymous; Therefore, the privacy of participants is respected

4. Results

4.1 Mood

A multiple ANOVA was run to test whether there is a significant difference in mood (sadness, anxiety, and depression) based on the type of diet (omnivore, pescatarian, vegetarian and vegan). It was hypothesized that vegans would have the lowest scores on sadness, anxiety, and depression, thereby suggesting that they will have a better mood as compared to those on other diets. Furthermore, the homogeneity of covariances was assumed using the Box's M test ($p > .001$) (see Table 1).

The results revealed that there was a significant difference in mood based on the type of diet, Pillai's $F(9,492) = 2.06, p = .032$ (see Table 2). In addition, the type of diet had a significant effect on all three components of mood i.e., sadness, $F(3,164) = 3.35, p = .021$, anxiety, $F(3,164) = 5.64, p = .001$ and depression, $F(3,164) = 4.28, p = .006$ (see Table 3).

It was found that vegans had the lowest scores for all the three components of mood: sadness ($M = 10.8$), anxiety ($M = 6.29$) and depression ($M = 8.38$) (see Table 4) as compared to those on other diets. Therefore, the hypothesis was confirmed.

Table 1

Box's Homogeneity of Covariance Matrices Test

χ^2	df	p
33.5	18	.014

Table 2

The Effect of The Type of Diet on Composite Mood

		value	F	df1	df2	p
Type of diet	Pillai's Trace	.109	2.06	9	492	.032

Table 3

The Effect of The Type of Diet on Sadness, Anxiety and Depression

	Dependent Variable	Sum of Squares	df	Mean Square	F	p
Type of diet	Sadness	1012	3	337.3	3.35	.021
	Anxiety	1309	3	436.2	5.64	.001
	Depression	1639	3	546.3	4.28	.006
Residuals	Sadness	16522	164	100.7		
	Anxiety	12691	164	77.4		
	Depression	20951	164	127.7		

Table 4

Means of Sadness, Anxiety and Depression Based on The Type of Diet

	Type of diet	Sadness	Anxiety	Depression
Mean	omnivore	16.5	12.6	15.1
	vegan	10.8	6.29	8.38
	pescatarian	13.5	10.0	12.9
	vegetarian	13.9	10.5	14.0

4.2 Memory

A one-way between-subjects ANOVA was run to investigate whether the type of diet had an effect on memory scores as assessed by the Digit Span Task. It was hypothesized that there will be a significant mean difference between the memory scores of omnivores and vegans and that vegans will have the highest mean scores.

According to Levine's test of homogeneity, the assumption of homogeneity of variances was assumed ($p > .05$) (see Table 5). However, the assumption of normality was violated ($p < .05$) (see Table 6).

The results revealed that the type of diet had a significant effect on memory scores $F(3,164) = 3.96, p = .009, \eta^2 = .068$ (see Table 7). Furthermore, vegans ($M = 7.62$) had the highest mean scores on memory as compared to omnivores ($M = 6.59$), vegetarians ($M = 6.50$) and pescatarians ($M = 6.55$) (see Table 8). In addition, the Tukey post hoc analysis revealed that the mean difference (1.0272) between the memory scores of vegans and omnivores was statistically significant ($p = .024$) (see Table 9). Therefore, both the hypotheses were confirmed

Table 5

Homogeneity of Variances Test (Levene's)

F	df1	df2	p
1.97	3	164	.120

Table 6

Normality Test (Shapiro-Wilk)

Statistic	p
0.977	.007

Table 7

One-way Between-subjects ANOVA for Memory Scores Based on the Type of Diet

	Sum of Squares	df	Mean Square	F	p	η^2
Type of diet	47.3	3	15.76	3.96	.009	.068
Residuals	652.4	164	3.98			

Table 8*Estimated Marginal Means - Type of diet*

Type of diet	Mean	SE	95% Confidence Interval	
			Lower	Upper
omnivore	6.59	.285	6.03	7.15
vegan	7.62	.218	7.19	8.05
pescatarian	6.55	.601	5.36	7.73
vegetarian	6.50	.407	5.70	7.30

Table 9*Post Hoc Comparisons - Type of diet*

Comparison		Mean Difference	SE	df	t	Ptukey
Type of diet	Type of diet					
omnivore	- vegan	-1.0272	.359	164	2.8651	.024
	- pescatarian	.0464	.665	164	.0697	1.000
	- vegetarian	.0918	.497	164	.1848	.998
vegan	- pescatarian	1.0736	.640	164	1.6788	.338
	- vegetarian	1.1190	.462	164	2.4241	.077
pescatarian	- vegetarian	.0455	.726	164	.0626	1.000

5. Discussion

This study examined the differences in mood and working memory based on the type of diet, i.e., omnivore, pescatarian, vegetarian and vegan. In the context of memory, it was hypothesized that there will be a significant difference between the DST scores of omnivores and vegans and that vegans will have the highest mean scores. Furthermore, in regard to mood, the

hypotheses stated that vegans will have the lowest scores on sadness, anxiety and depression implying that they will have a better mood as compared to those on other diets.

The data showed that the differences in an individual's mood and performance on memory tasks based on the type of diet were statistically significant as supported by previous research done on the mind-body connection and the gut dysbiosis model. In line with the memory hypotheses, it was observed that vegans performed significantly better than omnivores on the Digit Span Task while securing the highest mean scores overall, as compared to those on other diets. These results remain consistent with the findings of rodent studies that confirm the links between hippocampal memory deficits and a high fat high sugar diet (Underwood, 2016).

Furthermore, as suggested by the mood hypothesis, vegans had the lowest scores on sadness, anxiety and depression as assessed by the DASS21 questionnaire. One explanation to this could be the presence of high amounts of fiber, unsaturated fatty acids and polyphenols in such diets that have previously been linked to low depressive symptoms (Okereke et al., 2012; Noble et al., 2017; Yeomans, 2017; Firth et al., 2018; Lassale et al., 2019; Firth et al., 2020). Contrastingly, omnivores had the highest scores on these negative aspects of mood, thereby indicating a negative impact of meat-based diet on mood. These findings build upon evidence from studies that link high amounts of arachidonic acid found in animal fats to disturbances in mood (Beezhold and Johnston, 2015).

Therefore, both the mood and memory hypotheses were confirmed. The study indicated that variability in mood and memory can be explained through differences in the type of diet. It can be inferred that a vegan diet had a positive effect on working memory as well as mood. However, the present study had a small number of

responses from pescatarians as compared to other diets consequently influencing the accuracy of the results. Therefore, for further research, it is recommended to aim for more equal sample sizes for all dietary groups.

Constructing upon prior evidence that emphasizes on the links between various nutritional components and cognition the present study, provides a new insight on the links between specific diets (divided on the bases of animal product inclusion) and cognitive function. It also supports the gut brain hypothesis (Agranoff, 2008; Noble et al., 2017; Mohajeri et al., 2018; Smith & Scholey, 2014; Firth, et al., 2020; Tomova et al., 2019; Jia et al., 2020) and provides ground for further research on the links between vegan diet and cognitive brain functions. Since this study had an adult sample further research can be conducted on children. Additionally, the impact of vegan and other predominantly plant-based diets can be studied in context to other cognitive functions as well as specific aspects of mood.

6. Conclusion

The study examined the presence of a significant difference in mood and memory regarding the type of diet. The research was concerned with veganism, as there is a lack of research in this area. Assessments of the results showed that both memory and mood were significantly different based on diet. The hypotheses that vegans will have the lowest scores on sadness, anxiety, and depression and that there will be a significant difference in memory scores of omnivores and vegans were confirmed. The results linking omnivorous lifestyle with poorer working memory and mood are consistent with previous studies and the gut-brain hypothesis. Furthermore, the results suggest that a vegan lifestyle leads to an improved overall mood and better cognitive abilities, providing a framework for future studies into the impact of veganism on cognition.

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COVID-19 Related Anxiety Influences Decision-Making under Ambiguity

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Abstract

Previous research has established the negative role which anxiety plays on decision-making processes. Considering the current events and related psychosocial distress, it is possible that COVID-19 related anxiety may negatively influence decisional processes. The current study presents the first evidence on the role that COVID-19 related anxiety plays in decision-making processes measured by the Iowa Gambling Task (IGT). Analyzing the responses of 48 participants (age range 18–51) on the COVID-19 Anxiety Syndrome Scale and IGT, it was established that individuals with higher levels of COVID-19 related anxiety exhibit worse decision-making strategies under ambiguity. Bayesian inferential analyses further confirm this hypothesis. Details and results are further discussed and explored.

Keywords: COVID-19, anxiety, Iowa Gambling Task, decision-making

1. Introduction

Since December 2019, the outbreak of coronavirus (COVID-19) profoundly and swiftly affected the lives of many individuals (C. Wang et al., 2020). As of 22 February 2021, there have been almost 111 million confirmed cases of people infected with COVID-19 (World Health Organization [WHO], 2021a). The governments of many countries responded to this pandemic with the introduction of many life-changing measures such as lockdowns. As early studies showed (e.g., Liu et al., 2020; Qiu et al., 2020), the current COVID-19 pandemic and the related governmental measures brought immense psychological distress to many individuals. Particularly, together with strict quarantine measures, COVID-19 has become the main topic of discussion among people and mass-media, thereby fostering an excessive preoccupied thinking about

this pandemic (Lee, 2020a); hence, increasing anxieties and worries of the general population (Nikčević & Spada, 2020).

Anxiety is an important mediator of decision-making processes. It is well established that abnormal levels of anxiety negatively impact decision-making (e.g., Miu et al., 2008; Zhang et al., 2015). Due to the anxiogenic effects of COVID-19 (Lee, 2020a; Peteet, 2020; Qiu et al., 2020), it is necessary to establish how COVID-19 related anxiety impacts people's decision-making. The Iowa Gambling Task (IGT; Bechara et al., 1994) is such a task that allows the observation of decision-making processes under ambiguous premises. Researchers (Bechara & Damasio, 2005; Miu et al., 2008; Zhang et al., 2015) have demonstrated that variance on IGT performance is sensitive to levels of anxiety.

To the best of my knowledge, to the current date there is no study which examined the effects of COVID-19 related anxiety on decision-making. With the present research, I intend to supplement the current literature on the influence of anxiety on decision-making by including COVID-19 related anxiety. Hence, I will explore how COVID-19 anxiety as measured through the COVID-19 Anxiety Syndrome Scale (C-19ASS; Nikčević & Spada, 2020) relates to IGT performance, hypothesizing that individuals with lower levels of COVID-19 related anxiety will perform the best.

2. Literature Review

2.1 The Psychological Impact of COVID-19

Because of the rapid proliferation of COVID-19 across the planet, by March 2020 the WHO (2020) declared a pandemic state. In response to this crisis, many countries have imposed restrictive measures such as lockdowns and the forced cessation of working activities. In concordance with previous data during the times of SARS (e.g., Chua et al., 2004; Hawryluck et al., 2004) and H1N1 (Goodwin et al., 2009; Wheaton et al., 2012; cf. Y. Wang et al., 2011) pandemics, the effect of the restrictive measures taken against COVID-19 appear detrimental to the psychological health of the population at large (e.g., Cao et al., 2020; Groarke et al., 2020; Qiu et al., 2020; Romero et al., 2020).

The short-term psychological sequelae of COVID-19 are quite alarming. A first line of research conducted in China demonstrated that since the outbreak of COVID-19 there has been a dramatic rise in psychological disorders such as anxiety, panic disorders, and depression (Qiu et al., 2020). Additionally, people pertaining to risk groups (e.g., preexisting respiratory or cardiovascular diseases, obesity, diabetes; Stein, 2020) exhibited higher levels of psychological distress (Liu et al., 2020). Unfortunately, it is possible that the psychological distress connected with COVID-19 will outlast the current restrictive measures. In

various countries, post-lockdown levels of psychological distress did not seem to decrease in relation to pre-lockdown levels (Grover et al., 2020; Gullo et al., 2021; Khubchandani et al., 2021). Particularly, to limit long-term negative consequences, there is the fundamental need of improving the quality and availability of facilities offering mental health support which is especially needed for the current upsurge of anxiety-related disorders (Qiu et al., 2020).

2.1.1. COVID-19 Related Anxiety

Elevated levels of anxiety represent a common finding during times of pandemics (Cao et al., 2020; Hawryluck et al., 2004; Nikčević & Spada, 2020; Wheaton et al., 2012). Common anxiogenic causes are exemplified by fear of infection, grief, and uncertainty regarding future outcomes (Peteet, 2020). Nevertheless, COVID-19 by itself it is not to be considered the only anxiogenic cause. Indeed, mass-media unifocal attention on COVID-19 and frequent fake-news exacerbate the already distressing nature of the COVID-19 pandemic (Lee, 2020a).

To measure levels of COVID-19 related anxiety, several psychometric instruments have been recently developed (Lee, 2020b; Nikčević & Spada, 2020; Silva et al., 2020; Taylor et al., 2020). For the purpose of this study, I decided to adopt Nikčević and Spada's (2020) COVID-19 Anxiety Syndrome Scale (C-19ASS) because of its inclusive measuring of several anxiogenic factors. The properties and factors are further discussed in the next section.

2.1.2. C-19ASS

In comparison with other COVID-19 related psychometric measures, the C-19ASS (Nikčević & Spada, 2020) considers additional anxiogenic factors such as avoidance, threat monitoring, and uneasiness. The final results of exploratory and confirmatory factor analyses produced a 9-item scale with two distinct and reliable factors: C-19ASS perseveration (C-19ASS-P; $\alpha = .86$) and

C-19ASS avoidance (C-19ASS-A; $\alpha = .77$). C-19ASS-P measures the extent of perseverate thinking about COVID-19, whereas C-19ASS-A assesses the degree of avoidance, worry, and threat monitoring for the virus; hence, two factors which are possibly linked to psychopathological outcome (Lee, 2020a).

Additionally, throughout the developing of this scale, Nikčević and Spada (2020) examined the relation between personality factors (as protective or vulnerability factors) and COVID-19 related anxiety; thus, showing that C-19ASS-A subscale is negatively related to conscientiousness and positively related to agreeableness and openness, while the C-19ASS-P is negatively related to conscientiousness and extraversion and positively related with neuroticism.

2.2 Decision-Making

Decision-making represents an essential part of our everyday lives. However, under some circumstances, it can be difficult for an individual to choose the most beneficial option among others (e.g., Damasio, 1994). Indeed, despite we take decisions quotidianly, the decision-making process is a complex task, which can be influenced by personality characteristics and current mood (Buelow & Suhr, 2013; Suhr & Tsanadis, 2007). Similarly, decision-making is influenced by anxiety (Miu et al., 2008), addiction (Bechara & Damasio, 2002), or neurobiological damage (Bechara et al., 1994). Because of a steep rise in risky choices throughout adolescence (e.g., Moffitt, 1993), it should not surprise that age and its neuroendocrinological correlates also influence decision-making processes (Almy et al., 2018; Rosenbaum & Hartley, 2019).

2.2.1 Impact of Anxiety on Decision-Making

Anxiety can affect the human body in multiple ways (Gray, 1987; Krans et al., 2014; McEwen, 1998; Watt & Panksepp, 2009). As previously indicated, decision-making processes might be one of them. Miu et al. (2008)

observed that participants who were in the high and low trait anxiety (TA) group performed the worst on a decision-making task. Using a similar paradigm, also Zhang et al. (2015) found that these individuals take worse decisions in ambiguous situations.

Neurobiological mechanisms may mediate these observed outcomes. From a learning perspective focused on how physiological states influence behavior, high TA contributes to behavioral inhibition while low TA to behavioral initiation (Gray, 1987). On the one hand, low anxiety is relatable to hyposensitivity to punishment (Patrick, 2001) predisposing the individual to a more impulsive decision-making (Fowles, 1980), especially when rewards are present (Blair et al., 1997). On the other hand, elevated levels of anxiety make the individual more susceptible to aversive stimuli (Carver & White, 1994), which in turn can affect the individual's capability to filter irrelevant cues when taking decisions (Leon & Revelle, 1985).

2.2.2 The Iowa Gambling Task

Experimentally, the Iowa Gambling Task (IGT; Bechara et al., 1994) is employed to measure decision-making under ambiguity. This task was originally used to assess decision-making processes of patients with lesions to the ventromedial prefrontal cortex (Bechara et al., 1994, 2000; Bechara & Damasio, 2002). Nevertheless, it has been employed for testing how TA impacts decision-making processes as well (e.g., Miu et al., 2008; Zhang et al., 2015). Additional information regarding the functioning of the IGT and the way it has been employed in the current study will be offered in the methods' section.

In the present study, I explore the connection between participants' IGT result and COVID-19 related anxiety. To the best of my knowledge, to the current date this is the first study examining how COVID-19 anxiety impacts decision-making. Considering this, the main hypothesis is

that participants with lower levels of COVID-19 related anxiety will perform the best on the IGT.

3. Methods

3.1 Participants and Procedure

The researcher recruited participants in this study at his convenience through social media and other electronic means (e.g., email, university sites, etc.). The only inclusion criterion was to be at least 18 years old. Data from the C-19ASS and IGT were collected using PsyToolkit (Stoet, 2017). All statistical analyses were conducted using Jamovi (The Jamovi Project, 2021).

The final sample was of $N = 48$ participants (34 females; age: $M = 24.46$, $SD = 6.79$, range = 18–51). The participants had to complete demographics, C-19ASS, and IGT in this order. All study participants provided their informed electronic consent in compliance with the 1987 revised Declaration of Helsinki before beginning the survey. This study has been approved by the ethical committee of the University of New York in Prague.

3.2 Materials

3.2.1 C-19ASS

The C-19ASS is a newly developed scale for the screening of COVID-19 related anxiety (Nikčević & Spada, 2020). It is a 9-item measure with two factors: perseveration and avoidance (see Section 2.1.2 for more details). The items are measured on a 5-point Likert scale where 0 corresponds to “Not at all” and 4 to “Nearly every day”.

3.2.2 IGT

The IGT (Bechara et al., 1994) has been employed in several studies concerning the effect of anxiety on decision-making processes (e.g., Miu et al., 2008; Zhang et al., 2015). In this task, participants are given \$2000 and are

told that they should maximize their profits. Of the four total decks (A, B, C, D), participants are instructed that there are some advantageous decks and some which are disadvantageous. In the present study, decks A and B were the disadvantageous ones. Indeed, even though the gains were higher (\$100 vs \$50 in decks C and D), they held higher and more frequent penalties (\$250 vs \$50). To maximize profits, the correct strategy would be of selecting deck D (lesser frequency of penalties). Participants are given 100 trials (i.e., 5×20 blocks) to develop the best strategy and maximize their initial money.

In this study it was calculated the five blocks’ net-score by subtracting to the sum of C and D that of A and B (i.e., Block Score = $[(C + D) - (A + B)]$). This procedure was done to observe whether participants improved or not their choices throughout the IGT. Finally, a total net score was calculated by the sum of all five blocks’ net-score.

Table 1.

Descriptives of the Utilized Measures

	C-19ASS	IGT-NET
<i>N</i>	48	48
<i>M</i>	14.54	11.52
<i>Mdn</i>	13.00	1.00
<i>SD</i>	7.23	33.94
Range	0–33	-30–94
Shapiro-Wilk <i>p</i>	.838	< .001

4. Results

Descriptive data of the measures employed can be found in Table 1. The computed Pearson’s correlation coefficient did not determine any significant correlation between age and the used measures, and a point-biserial correlation coefficient did not show any significant correlation between gender and the two measures (see Table 2); hence, the data did not require any stratification.

Table 2.

		C-19ASS	IGT
Age	$r_{Pearson}$	-.13	-.03
	$p_{Pearson}$.382	.838
Gender	$r_{point-biserial}$	-.14	.20
	$p_{point-biserial}$.349	.170

To explore the differences across different groups, the scores on the C-19ASS had to be categorized. For categorizing the scores on the C-19ASS, the utilized cut-off threshold was -1 SD from the mean ($M = 14.54$; $SD = 7.23$; see Table 1). Those scoring 7 or below were included in the low C-19ASS group ($N = 9$), while those scoring 8 or above became part of the high C-19ASS group ($N = 39$). The C-19ASS used in this study had a satisfactory Cronbach's alpha coefficient on standardized items for internal consistency ($\alpha = .79$).

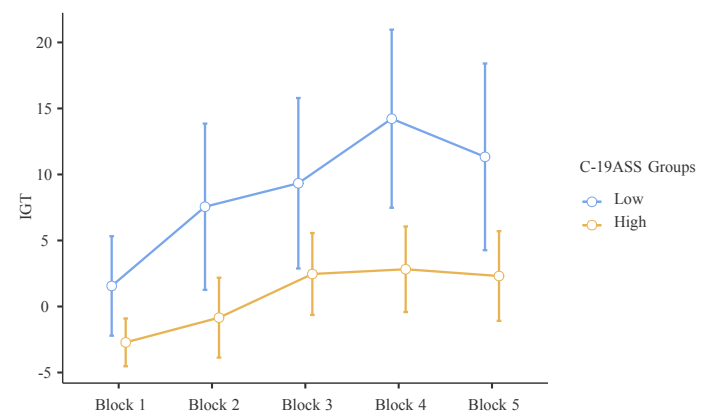
Table 3.

Mann-Whitney U Test for IGT Score Difference between Low and High C-19ASS Groups

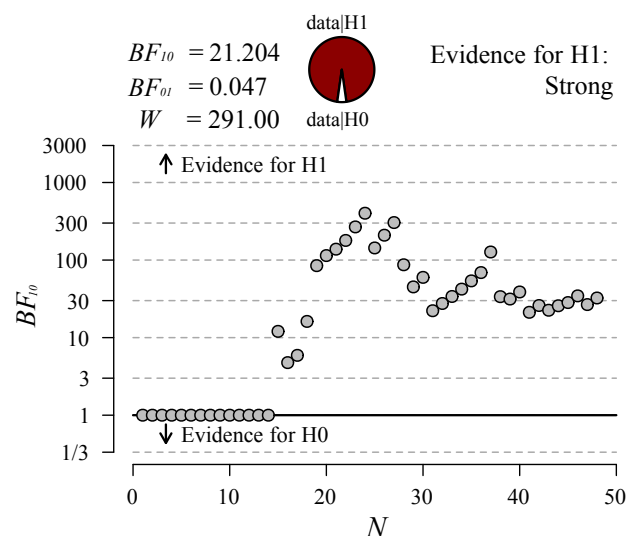
	U	p	Rank-Biserial Correlation		
	60.00	.002	.66		
	N	M	Mdn	SD	SE
Low	9	44.00	48.00	35.07	11.69
High	39	4.03	-8.00	29.30	4.69

Since IGT scores were not normally distributed ($p < .05$; see Table 1), a Mann-Whitney U Test with C-19ASS groups as the grouping variable was conducted to explore the differences across IGT net-scores. The IGT score was greater for the low C-19ASS group ($Mdn = 48.00$) than for the high C-19ASS group ($Mdn = -8.00$) and the difference across the two groups was statistically significant, $U = 60.00$, $p = .002$ (see Table 3). Furthermore, a repeated measures ANOVA with C-19ASS groups as the between-subject factor and the IGT net-scores' blocks as the within-

subjects factor was performed to better analyze participants' performance on the IGT. The interaction effect was not statistically significant. Nevertheless, the between-subjects' effect was statistically significant, $F(1, 46) = 12.66$, $p < .001$, $\eta^2 = .10$, and there was a significant main effect for the blocks, $F(3.21, 147.48) = 6.13$, $p < .001$, $\eta^2 = .06$; thus, demonstrating that the IGT performance significantly changed across the five blocks (see Figure 1).

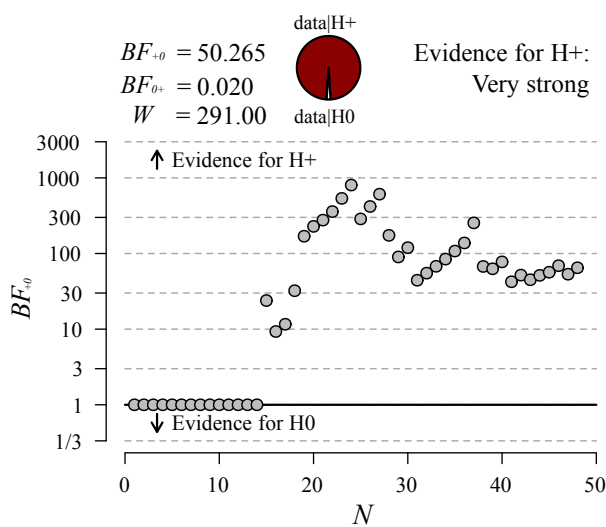
Figure 1

The researcher admits that a sample size of 48 individuals can be considered relatively scarce. To address this issue, Bayesian analyses for statistical inference using a Cauchy prior were also performed.

Figure 2

The results of a Bayesian U test with C-19ASS groups as the grouping variable exhibited strong evidence for the alternative hypothesis (i.e., that IGT scores are different across the two groups), $BF_{10} = 21.20$, $W = 291.00$ (see Figure 2). Additionally, if specified that the low C-19ASS group will have a greater IGT score than the high C-19ASS, the evidence for the alternative hypothesis increased, $BF_{+0} = 50.26$, $W = 291$ (see Figure 3). The full dataset for these analyses is available at <https://osf.io/rwv87/>.

Figure 3



5. Discussion

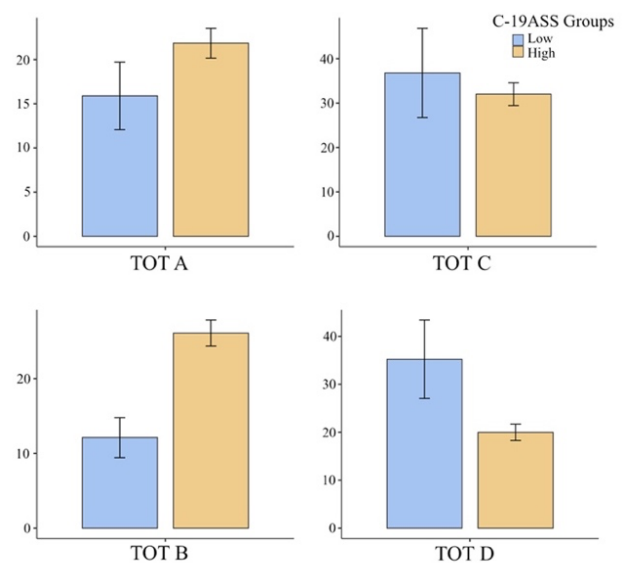
The present results confirmed the initial hypothesis. To the best of my knowledge, this study provides the first evidence about the effect of COVID-19 related anxiety on decision-making; thus, enriching the literature on anxiety and the IGT with novel significant data.

This study has been conducted between February and March 2021, one of the peaks of the COVID-19 pandemic. Majority of the participants were from Central and Eastern Europe (including Russia; $N = 28$), as well as from Northern and Western Europe ($N = 7$). As the author writes the discussion section, these regions appear to be among the most devastated by the pandemic (WHO, 2021b). Concerning this, it should not surprise that majority of the

participants ($N = 39$) were included in the high C-19ASS group. Furthermore, since neither gender nor age correlated significantly with C-19ASS score, it is possible to assume that the effects of the pandemic are experienced similarly across individuals.

The results obtained highlight a larger psychosocial issue in the current events. Lower scores on the IGT indicate problematic decision-making processes (Bechara et al., 1994). That is, majority of the participants in the high C-19ASS group were not able to develop a good strategy under ambiguity. Poor performance in the first block is generally expected since the task can appear quite vague (see Figure 1). Nevertheless, participants in the low C-19ASS group showed a quicker and better strategical development. The graphical representations of deck choice across the whole IGT procedure can be found in Figure 4. The high C-19ASS group often selected cards from deck B (i.e., high reward, high penalty); that is, participants in this group continued to pick deck B regardless of the negative outcome. Considering the literature on the IGT (e.g., Bechara et al., 1994; Buelow & Suhr, 2013; Bechara & Damasio, 2002), it is possible to infer from this result that participants in the high C-19ASS group prefer short-term gain notwithstanding long-term loss.

Figure 4



Placing these findings in the current events, COVID-19 has an alarming role in people's decision-making. Specifically, the anxiety engendered by the pandemic seems to have a deleterious influence on individual's long-term orientation. Indeed, if people favor immediate gratification, it could possibly lead to more incautious gatherings and networking; thus, jeopardizing the long-term containment of COVID-19. Additionally, impaired decision-making could foster unhealthier coping styles such as alcohol or drugs (e.g., Bechara & Damasio, 2002), the consumption of which has increased throughout the COVID-19 pandemics (e.g., Ornell et al., 2020). Governments should further finance the prevention and treatment of these long-term negative outcomes.

Nevertheless, despite showing that C-19ASS does influence decision-making, the present study could not determine whether decision-making processes are impaired by COVID-19 related anxiety alone. Indeed, it is also possible that governmental measures such as quarantines and curfews played a key role in the observed IGT score. Future studies should address this issue by developing new psychometric measures focused on the anxiogenic role of lockdowns and then establishing their involvement in decision-making processes. Furthermore, the present study has been conducted with no financial resources and a very limited sample size. Indeed, the present research can be considered as a pilot study from which, in virtue of satisfactory results, other researchers can develop full-scale studies to further explore the impact of COVID-19 on decision-making. For instance, future studies should consider administering the IGT in a laboratory setting. The PsyToolkit (Stoet, 2017) version used in this study was good-enough, however, allowing participants to ask further clarifications before the start could improve the validity of the results.

In order to allow replication and further research, the dataset is publicly available at <https://osf.io/rwv87/>.

6. Conclusion

This research is to the current date the first study done to establish the impact of COVID-19 related anxiety on decision-making processes. The results obtained confirmed the hypothesis that higher levels of COVID-19 related anxiety negatively affect decision-making. Notwithstanding the mentioned limitations, this study offers to health professionals and researchers additional evidence of the psychological effects of the COVID-19 pandemic.

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Yoga, Sports, and Prosocial Behavior of University Students

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Abstract

This paper studied whether there is a statistical difference between individual and team sports, yoga, and doing no sports on prosocial behavior of university students. It was hypothesized that sports are associated with a higher mean of prosocial behavior, that yoga will produce a statistically significant difference in prosocial behavior, and that it will be associated with a higher mean score in prosocial behavior than team sports or individual sports and that team sports will be linked to a higher mean prosocial behavior score than individual sports. Forty-seven participants took part in an online questionnaire involving a question on which sport they practice most regularly (yoga, individual sports, team sports, and no sports), in addition to questions on prosocial behavior, from the sixteen items of the Prosocialness Scale for Adults. Analyses through ANOVA and post-hoc analysis revealed a significant association between the type of sport and prosocial behavior, with a significant mean difference between participation in a sport and no sport.

Keywords: yoga, sports, prosocial, empathy

1. Sports and Prosocial Behavior of University Students

Prosocial behavior is a multidimensional construct involving acts that benefit the society, such as cooperation, volunteering, helping, and donating (Telzer et al., 2018). Not only does prosocial behavior contribute to society, but it also is associated with adult positive outcomes, such as mental health, self-esteem, and good peer relations. Consequently, it is important to understand how we may learn to develop prosocial behavior in society. One great influence on our prosocial behavior, is that of our friends' prosocial behavior, which is associated with our own

prosocial goal pursuit and behavior, and it is affected by the closeness and quality of the friendship. In general, the prosocial behavior of the people around us, can affect and even motivate our own prosocial behavior. Telzer also discusses that the influence that society has on our own prosocial behavior may be due to social learning (Bandura, 2001). Furthermore, our behavior is influenced by our group identity. The groups that we identify with, be it school cliques, sports teams, work colleagues, lead us to internalize group norms, which affects our self-definitions and behavior (Hogg & Reid, 2006). These norms involve the groups prototype and normative behavior and prescribe how one should behave in the group. A group with high

prosocial behavior as a norm may motivate prosocial behavior in all the members of the group. Different sports lead to the formation of groups or teams, and these groups also present behavioral and attitudinal norms. Each sport is most likely to produce a different level of prosocial behavior among its members. It is also important to define what 'sports groups' are. Not only do we have groups based on team sports, such as a group of football players or rugby players, but within individual sports, such as running or swimming, members of the sport identify themselves as swimmers or runners, although they do not cooperate with each other in order to win. Individual sports do not mean a lack of membership to a sports group. On the other hand, in team sports, members of the group cooperate in order to achieve a mutual goal. Yoga, which can be classified as an individual sport, can be studied as a field of its own, due to the importance placed on mindfulness and altruism. The reason why yoga is distinct from other sports is due to its vast inclusion of disciplines. It has earned many definitions such as, 'Indian gymnastics,' to 'religious philosophical teachings' (Safronov, 2013). In fact, the combination of religion, philosophy, and sports makes yoga a very interesting subject of study in the wide field of psychology in general. The basic goal of yoga is 'the calming of the mind', as such, yoga is accepted as any practice that may calm the mind from meditation, through the asanas (postures in yoga), to breathing exercises, or devotional chanting.

This paper will examine how team sports differ in prosocial behavior to individual sports, and whether yoga, which involves higher states of consciousness, is related to higher levels of prosocial behavior to a greater extent than both team and individual sports. Individual sports are those in which one person works towards achieving their personal performance objective, while team sports involve the cooperation of at least one other person to achieve a mutually important performance objective.

1.1 Literature Review

Sports play an important role in our self-identity (Rees et al., 2015). They are not simply an external feature of the world for behavior, but they also transform our self-concept qualitatively as we internalize the sport as a sense of self. Furthermore, the sports groups try to define themselves as positively distinct from other groups and sports groups. Whether prosocial behavior is a part of the group's norms through cooperation in order of obtaining this goal is unknown. This does not suggest that sports groups consciously incorporate prosocial behavior as a group norm, but rather that prosocial behavior may be expected or implicitly present within the groups' behavior. In addition to this, the study will look at whether prosocial behavior extends past the individual's sports group.

Certain personality traits, such as compassion and empathy, have been linked to higher prosocial behavior (Chierchia & Singer, 2017). While empathy is the ability to understand and share the emotions of others, compassion is the concern for the suffering of others in addition to wishing to promote their wellbeing. According to Chierchia and Singer, while watching someone in distress, empathy may lead to two outcomes. Firstly, we may feel compassion for the person and make prosocial decisions, such as helping them. Secondly, we may feel empathic distress which leads to self-interested decisions, such as helping ourselves to avoid the unpleasant feeling. As such, compassion paired with empathy may lead to the positive outcome of prosocial behavior. A review focused on the interesting relationship between sports and empathy (Sevdalis & Raab, 2014). Sports use the human body in order to achieve performance, and body movements can be used to look into cognition and interaction. They involve the accomplishment of concrete objectives and coordination of movement, which may involve the prediction of upcoming events, the recognition of other's movements and intentions, and of adapting one's own

behavior accordingly. A basketball player who is trying to score might see the defender look to his right in order to move in that direction to block him, as such, the attacker will move to the left to evade him. Sevdalis and Raab describe this performance and perception relationship as a consequence of empathy, where one individual can achieve a similar state to the other individual. Another important point of the review is that females have been exhibiting higher levels of empathy than males in the studies, in both sport and non-sport activities. One of the reasons for this is that females place a larger importance on the interpersonal dimensions of team sports. Furthermore, up to 76% of yoga practitioners tend to be women, and as such, the social behavior of yoga practitioners as a whole may be influenced by gender (Park et al., 2015).

Meditation is an important part of yoga practice. Based on a literature review from 2017, meditation can increase both empathy and compassion, and possibly as a result of the mentioned combination of empathy and compassion, there was also an increase of prosocial behavior as a result of mindfulness interventions (Luberto et al., 2017). Based on a systematic review and meta-analyses on meditation and prosocial behavior, five types of social behavior were identified, including compassion, empathy, aggression, connectedness, and prejudice (Kreplin et al., 2018). Meditation, a part of yoga, is defined as focusing on the present moment without any judgement of inner and outer experiences. The researchers mention that interest in meditation has risen due to its speculative qualities that transform individuals and societies and promote qualities, such as altruism and connectedness. Furthermore, they suggest that meditation may be used in prisons to promote prosocial behavior and decrease aggression and prejudice. In other words, the researchers wished to investigate meditation as a tool to make the world a more compassionate and less aggressive place. Through meta-analyses of 3-minute meditations to 3-month meditation retreats the researchers found prosocial and positive effects

of emotion centered meditation such as compassion meditation, where one centers their thoughts around love towards self and others. The results show that meditation may increase prosocial behaviours through increases in compassion and empathy, however, there was no effect on aggression, connectedness, or prejudice. This suggests that while aggression and prejudice may have negative social outcomes, it may be distinct from prosocial behavior. Based on the meta-analyses, meditation appears to have a positive effect on prosocial behavior.

According to the findings, a mixed model of emotional intelligence is a good predictor of prosocial behavior (Martí-Vilar et al., 2019). Emotional intelligence is defined as the ability to identify emotions and modifying mental states. This also involves the recognition of other individual's emotions, making it a similar construct to empathy and compassion. The mixed model of intelligence involves social-emotional skills, and it goes beyond simply processing emotional information. It includes having the ability to understand emotions and to regulate emotions to reach emotional growth. Higher social-emotional skills are correlated with higher prosocial behavior, as it leads to social skills that increase the effectiveness of interactions with other individuals. Not surprisingly, the mixed model of emotional intelligence includes the component of interpersonal intelligence which contains empathy. Furthermore, collectivism was seen as a high correlate of prosocial behavior. Similar results are likely to be seen in team sports or in sports such as yoga, where members of the sport have a tendency towards a collectivist nature of through a feeling of being a part of the group, or through trying to achieve shared goals. Studies on emotional intelligence have been of importance lately, as it has become recognized that a high intelligence quotient is not always a good predictor of personal or professional success, and instead, emotional intelligence may sometimes be used instead. Emotional intelligence may be a skill highly appreciated in such positions as a manager of

a business. Yoga is now being considered an integral part of business organization as it has been found to lead to enhanced emotional intelligence (Adhia et al., 2010). Due to the correlation of emotional intelligence and prosocial behavior, this finding would support the hypothesis that yoga is correlated to prosocial behavior to greater extent than individual or team sports, or no sports in general.

Another influence sports may have on prosocial behavior is through biological changes after exercise. The neurohormone oxytocin has been found to facilitate prosocial behavior (Lukas et al., 2011). Oxytocin is positively involved in parent bonding to infants, in addition to social bonding (Finkenwirth et al., 2016). In female mammals, oxytocin increases after giving birth and it increases behavior such as care taking, food sharing, and infant licking. There are limited studies on how oxytocin levels may change during exercise, however based on a study on marathon runners, there may be a small significant increase of oxytocin after running (Hew-Butler et al., 2008). Furthermore, yoga may also be linked to increased levels of oxytocin, and it has been shown to be effective in therapy for patients with Schizophrenia as it is shown to improve socio-occupational functioning and emotion recognition deficits (Gangadhar et al., 2013).

In conclusion, research has shown benefits of sports and yoga on constructs of prosocial behavior, such as empathy and compassion, in addition to showing links between yoga and constructs related to prosocial behavior, such as emotional intelligence. Furthermore, yoga has been used in therapy for patients with Schizophrenia in order to improve socio-occupational functioning linked to increases in oxytocin, which also occur after exercise. This study aims to fill in gaps of previous research by identifying whether sports in general are associated with higher prosocial scores, and whether yoga may have a stronger association with prosocial behavior compared to doing no sports or other types of sports.

1.3 Research Question

1. Is there a statistical difference between the levels of prosocial behavior for people who partake in sports in general and no sports?
2. Is there a statistical difference between the association of yoga and prosocial behavior as compared to individual sports or team sports?

1.4 Hypothesis

1. Regular practice of sports will show a statistically significant relationship with prosocial behavior.
2. Participants who practice yoga will have a higher mean on prosocial behavior than team sports and individual sports, or no sports.
3. Team sports will show a higher mean prosocial behavior than individual sports and no sports.

2. Method

2.1 Participants

Forty-seven students from the University of New York in Prague, were recruited through convenience sampling for an online questionnaire. The link was shared through the university's social media pages. The gender of the participants was approximately equally distributed with 53.2% being female ($N = 25$), and 46.8% being male ($N = 22$). The mean age of the participants was 23.6 ($SD = 2.88$), with the youngest participant being 20 years old, and the oldest participant being 33 years old. The majority of the participants were born in Central or Eastern Europe ($N = 34$).

2.2 Procedure

A link to an online google docs questionnaire was made available for participants through the university's social

media webpage. The first part of the questionnaire involved an informed consent form which obeys GDPR laws and omits any personal information. Following this, participants were asked to fill out the three sections of the questionnaire, which took up to 10 minutes and included the sections on regular sport activities, prosocial behavior, and demographics information. The data collected included the regular sport of practice, the total score for prosocial behavior as calculated through the total scores on a Likert scale, and demographic information including gender, region of birth, and age. Finally, participants were debriefed through a debriefing form at the end of the questionnaire with instructions on how to receive any further information on the research if they are interested. The study was reviewed by the course instructor to assess potential ethical risks.

2.3 Instrumentation

Participants were asked for consent through an online consent form. A questionnaire was used to collect data on the type of sport, on the score for prosocial behavior, and on demographic information. For the type of sport, participants were asked to select the sport that they most regularly practice from yoga, team sports (Football, basketball, volleyball etc...), individual sports (Running, skiing, horse riding, tennis, etc...), and no regular sport. For the prosocial behavior section of the questionnaire, the sixteen items of the Prosocialness Scale for Adults were used (Caprara et al., 2005). The questionnaire contains 16 items including, 'I try to help others,' and 'I am emphatic with those who are in need.' Answers are rated on a five-point Likert scale with the statement being *almost never or never true* (scored as 1), *occasionally true* (scored as 2), *sometimes true* (scored as 3), *often true* (scored as 4), and *almost always/always true* (scored as 5). The total of the scores of the 16 items was the prosocial behavior score of the participant with a higher total meaning higher prosocial behavior. The demographic part of the questionnaire

included gender, age, and region of birth. Finally, participants were debriefed through an online description of the study.

2.4 Research Design

The study was quasi-experimental, with no random assignment to groups in order to manipulate the prosocial behavior score. The independent variable was the type of sport including yoga, individual sports, team sports, and no sport. The dependent variable was the prosocial behavior score which was the total score from the 16-item questionnaire. The research was quantitative, and the data was statistically analyzed through a one-way design.

2.5 Data Analysis

The hypotheses were tested through a one-way ANOVA analysis for unrelated scores. This revealed whether the score for prosocial behavior changes based on the different categories of the independent variable, which was sport. While the ANOVA test showed that not all the means are equal, a post-hoc test explored the differences between the various group means in addition to controlling for type 1 error and reducing the chances of a false positive result. Descriptive statistics included the percentage of female and male participants in the study, the frequency of the regions from which the participants were born, and finally, the range and mean of the age of the participants. The mean average and standard deviation were calculated for the prosocial behavior score, including the range of the scores and mean prosocial score for each sport category.

3. Results

3.1 Descriptive Statistics

Descriptive statistics for prosocial behavior scores were calculated ($M = 62.5$, $SD = 13.4$). The descriptive statistics for type of preferred sport and prosocial behavior score were also calculated (see Table 1). Data was normally

distributed for each of the conditions ($p > .05$) as assessed by Shapiro-Wilk's test of normality. There was homogeneity of variance as assessed by Levene's test of homogeneity ($p > .05$).

Table 1

Means and Standard Deviations on Prosocial Score for Yoga, Team Sports, Individual Sports, and No Sports

Sport	<i>n</i>	Mean	Standard Deviation
Yoga	11	71.5	5.94
Team Sports	10	67.5	5.74
Individual Sports	16	62.7	12.52
No Sports	10	47.2	13.79

3.2 Test of Hypotheses

A one-way ANOVA for unrelated scores was conducted to see if the type of preferred sport would influence the score of prosocial behavior. The participants who chose yoga as their preferred sport had the highest mean for the prosocial score in comparison with individual sports, team sports, and no sports (see Table 1). There was a statistically significant difference between the type of preferred sport chosen and the prosocial behavior score $F(3,43) = 10.6, p = .000$. The Tukey Post Hoc test showed that the difference between yoga and no sports was statistically significant (24.3, $p < .05$), as well as the difference between Individual sports and no sports (15.5, $p < .05$) and team sports and no sports (-20.3, $p < .05$).

4. Discussion

4.1 Summary of Findings

Regarding the difference between sports and prosocial

behavior, the hypothesis that regular practice of sports will show a statistically significant relationship with prosocial behavior is supported. However, there was only a statistically significant difference in means between yoga and no sports, individual sports and no sports, and team sports, and no sports. As such there was a significant difference in prosocial behavior based on the practice of a sport or not having any regular sport. The participants who practice yoga did have a higher mean prosocial behavior score, however, the difference was not statistically significant. As such, H2 and H3 cannot be supported as there was no statistical significance in the mean prosocial score between yoga and the other sports, or between team sports and individual sports.

4.2 Interpretation of Findings

While the participants that practice yoga had the highest mean prosocial behavior score, the difference was not significant, as such the association between yoga and prosocial behavior could not be studied further. However, there was a statistical difference between all three sports, and no sport. As such, it may be concluded that there is an association between performing sports and prosocial behavior. Based on the literature review, there are a few possible explanations for this association. Based on the association of sports and empathy, sports use the human body in order to achieve performance, and body movements can be used to look into cognition and interaction (Sevdalis & Raab, 2014). They involve the accomplishment of concrete objectives and coordination of movement, which may involve the prediction of upcoming events, the recognition of other's movements and intentions, and of adapting one's own behavior accordingly; a function attributed to empathy. It is uncertain however, whether people who partake in sports have a higher level of empathy, or whether sports may be increasing empathy. Empathy has been linked to increased prosocial behavior (Chierchia & Singer, 2017). Another

explanation for the relationship between sports and prosocial behavior is that sports play an important role in our self-identity, and we identify with our sports groups, whether they are individual or team sports, or the practice of yoga (Rees et al., 2015). These sports cause us to interact with other members of the same sport and work on our social behavior.

While it was hypothesized that team sports may be associated with a higher mean on prosocial behavior due to the cooperation involved in obtaining mutual goals, it may be that identification to any sports group, or even social group in general improves social behavior. Based on a study on sports team in-group cohesion, increased member cohesion lead to positive effects on antisocial behavior towards opponents and on prosocial behavior (Bruner et al., 2014). In other words, undesirable antisocial behavior towards opponents decreased, while prosocial behavior towards ingroup members increased. As there was a statistical difference in the results between sports and no sports, there appears to be a difference based on whether someone performs any sport at all. As such, social identity towards any social group in comparison to identity to sports teams is of interest, with a specific focus on the strength of identity or of cohesion. According to Pescosolido and Saavedra, cohesion has been one of the most important variables in the study of small group dynamics (2012). Cohesion is especially significant in the study of identity in sports teams as sports teams appear to work in well-defined contexts, with well-defined goals, member roles, available resources, working procedures, and more, to a greater extent than other types of teams. However, there is a lack of studies focusing on the strength of cohesion and identity of sports teams in comparison to other groups.

The association between sports and prosocial behavior may also have a biological base. This could be examined by the relationship between oxytocin and prosocial behavior (Lukas et al., 2011). As mentioned in the

literature review, based on a study on marathon runners, there may be a small significant increase of oxytocin after running (Hew-Butler et al., 2008). Furthermore, yoga may also be linked to increased levels of oxytocin, and it has been shown to be effective in therapy for patients with Schizophrenia as it is shown to improve socio-occupational functioning and emotion recognition deficits (Gangadhar et al., 2013).

Finally, the results support the findings of a study that focused on sports participation and psychosocial health in children (Moeijes et al., 2018). The children in the study were asked to fill in a psychosocial health questionnaire focused on internalization, externalization, and prosocial behavior, in addition to a sports participation questionnaire. Membership to a sports club or a high frequency of sports participation were longitudinally associated with better prosocial behavior.

4.3 Limitations

The study only analyzed the results of 47 participants, with at least ten participants in each group. While certain trends in the means could be observed, a larger sample of participants may be necessary to analyze any differences between the means of participants that perform yoga with participants that participate in individual and team sports. Due to convenience sampling, there may also be sampling bias through self-selection into the research, as participants with higher prosocial behavior may have been more willing to partake in the research. In addition to this, individuals that do not practice any sport may have been uninterested in participating in a 'sports and social behavior' questionnaire. While the participants were asked to choose only one sport that they practice the most regularly, it may be possible that they also have a secondary sport that they practice often and as such, the mean differences between the three types of sports may have been affected. Furthermore, the practice of the sport may vary based on

intensity, setting, and regularity of the sport. For example, there may be differences based on whether a person practices yoga alone or in a group, whether someone plays basketball once or three times a week, and whether a person runs for health benefits or competitively. The results can only be applied to a general participation in sports, and this may limit any potential effects and findings of the nature of the sports.

4.4 Implications and Future Research

Based on the results, there appears to be a significant association between participating in sports and prosocial behavior. Prosocial behavior is a multidimensional construct involving acts that benefit the society, such as cooperation, volunteering, helping, and donating (Telzer et al., 2018). Not only does prosocial behavior contribute to society, but it also is associated with adult positive outcomes, such as mental health, self-esteem, and good peer relations. Consequently, it is important to understand how we may learn to develop prosocial behavior in society, and an approach involving the participation in sports may help with this development. This may even be useful for mothers deciding which school clubs their children should join in order for the child to socially develop.

Further research should focus on increasing our understanding on how sports are associated with prosocial behavior. This may include a correlational study on the regularity of practice of a sport and prosocial behavior. Another understudied topic in this field is that of identity in sports teams in comparison to other groups, for example political or social groups, and how this identity might affect prosocial behavior. Finally, research should focus on in-group cohesion in sports and how it affects social behavior in general outside of the group environment, as studies generally focus on in-group behavior.

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A Validation Study of the Culture-Relevant Sociosexual Orientation Inventory

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Abstract

Previous literature defined sociosexual orientation as the willingness of an individual to engage in uncommitted sexual relationships. To the present date, psychometric instruments measuring this construct did not explicitly take in consideration the possible cultural forces shaping human sociosexuality. We aimed at developing an instrument designed to measure sociosexual orientation independently of cultural influences. In this validation study, we administered our newly developed Culture-Relevant Sociosexual Orientation Inventory (C-SOI), together with previous measures sensitive to sociosexual orientation, to an international cohort ($N = 71$; age range 18–37). Our results strongly supported the idea that culture contributes to the construct of sociosexuality. From factor analyses we could establish our C-SOI as a 9-item scale with four dimensions: behavior, attitude, desire, and connection. We provide the first measure of sociosexuality which is compatible with cross-cultural research.

Keywords: sociosexuality, culture, sexual behavior, psychometrics, self-construct

1. Introduction

In the context of human evolution, mating strategies have often played a pivotal role in the geographical distribution of certain genotypes. Similarly, environmental pressures chiefly contribute to the phenotypic variation of sexual approaches (Buss, 1991). Following Life History Theory (LHT; e.g., Del Giudice, 2014), favorable environments are generally correlated with slow life history strategies (LHS), whereas in aversive ecologies there is higher density of fast LHS (Belsky et al., 1991; Del Giudice et al., 2015). In a hostile environment where the individual's future is majorly uncertain, lower general trust (Putnam, 2000) and profiting from short-term high-risk action (usually at the detriment of others) proves to be the

more adaptive LHS (Del Giudice et al., 2011). In terms of mating strategies, the individual should maximize offspring's quantity over quality (Figueredo et al., 2006). Phenotypically, fast LHS are related to earlier sexual maturation (in terms of pubertal onset and age of first intercourse), lower parental investment, risk-taking behavior, and shorter life-expectancy (Baumard, 2019; Belsky et al., 1991; Del Giudice, 2009; W. Han & Chen, 2020).

2. Literature Review

2.1 Socio-Sexual Behaviors and Attitudes

The works of Kinsey et al. (1948, 1953) transformed the knowledge about sexual behaviors of both males and

females due to its first in-depth descriptive analysis; however, it also became surrounded by controversial scientific as well as public opinions. For instance, it has been criticized for its sampling methods (Cochran et al., 1953) due to overrepresenting male unrestricted participants (see Gebhard & Johnson, 1998, for more detail). Indeed, this may have supported a prejudiced comparison of genders, thereby resulting in a greater gender difference. Additionally, in both male and female samples, participants were only Caucasian (Kinsey et al., 1948, 1953); thus, cultural nuances that putatively influence sociosexual orientation may have been neglected. Nonetheless, the works of these authors laid a basis for future research in sexuality-related topics and contributed to the sexual revolution of the 60s due to reducing stigma and normalizing sexual perversions and promiscuity (Penke & Asendorpf, 2008).

From the collection of normative data, Kinsey et al. (1948, 1953) observed that promiscuity was found to be fairly common in both genders and the individual differences that were found got defined as socio-sexual behaviors and attitudes. Since then, individual sexual differences have been further confirmed (e.g., Buss, 2005) and factors have shown to covary including number of sexual partners, attitudes towards uncommitted sex, preference of intercourse frequency and occurrence of sexual fantasies (Harvey et al., 2004; Simpson & Gangestad, 1991).

Kinsey et al. (1948, 1953) defined sociosexuality as willingness to engage in uncommitted sexual relationships. The first psychometric instrument to measure this construct was introduced by Simpson and Gangestad (1991) under the name of Sociosexual Orientation Inventory (SOI), where sociosexuality was considered as a linear trait of a single dimension. This unidimensional model is divided into two clusters of unrestricted (high score) and restricted (low score) sociosexual orientation; that is, unrestricted individuals are gratified by having casual intercourse,

while restricted ones need an emotional closeness or commitment before coitus (Simpson & Gangestad, 1991).

Subsequently, newer versions of this instrument have been developed diverging from the unifactorial dimension of the original SOI. For instance, Jackson and Kirkpatrick (2007) developed a revised three-factor (short-term mating orientation, long-term mating orientation, previous sexual behavior) version to better reflect the diversity of human mating strategies and incorporating elements of attachment theory (i.e., avoidant romantic attachment style).

2.2 The Revised Sociosexual Orientation Inventory

Penke and Asendorpf (2008), similarly, introduced a revised version of the SOI. After the analysis of Simpson and Gangestad's (1991) SOI, their results consisted of a mixture of four-item categories: past sexual behaviors, future behavioral expectancy, frequency of unrestricted fantasies and attitudes towards sociosexuality (Penke & Asendorpf, 2008). Based on these findings, The Revised Sociosexual Orientation Inventory (SOI-R) added to the already present "behavior" and "attitude" items of Jackson and Kirkpatrick (2007) another one which explicitly measured sociosexual desire (Penke & Asendorpf, 2008). The three subscales of sociosexual behavior, sociosexual attitude, and sociosexual desire were found to have predictive validity for "courtship behavior, relationship outcomes and number of future sexual partners" (Penke & Asendorpf, 2008, p. 1116).

2.2.1 Sociosexual Behavior

The behavioral component of sexual interactions was already analyzed by Kinsey et al. (1948, 1953), whereby individuals varied in the frequency of uncommitted coitus. In the SOI-R (Penke & Asendorpf, 2008), the items in this subscale are aimed at quantifying actual sexual behavior (e.g., how many partners did you have in the last 12 months). This aspect is chiefly important for evolutionary

theory because it is ascribable to different reproductive strategies (Hill, 1993), such as fast or slow LHS. Generally, individuals following slow LHS will have fewer sexual partners but higher parental investment (Del Giudice, 2009; Ellis et al., 2009). Because of prioritizing committed relationships, these individuals allocate more resources (e.g., time and money) to their mates and offspring (Baumard, 2019; W. Han & Chen, 2020). Conversely, people following fast LHS will display more disinhibited mating strategies (Brüne, 2016; Del Giudice et al., 2015). At the individual level, faster strategists prioritize reproductive efforts at the detriment of resource investment (Figueredo et al., 2006; Patch & Figueredo, 2017). Relative to sociosexual behavior, fast and low strategists are related to promiscuous and pair-bonding behavior respectively (Olderbak & Figueredo, 2010).

2.2.2 *Sociosexual Attitude*

The attitude subscale consists of personal reflections about sex without commitment, as well as asking for standpoints on the need for closeness in sexual intercourse and moral judgements about these topics (Penke & Asendorpf, 2008). Cultural attitudes are putatively incorporated into this factor, yet no specific question targets this area. This decision has been taken by the authors following the evolutionary theory of culture reflecting the reproductive demands of the environment (see Gangestad et al., 2006, for more details), whereby culture variates individuals' sociosexual attitudes to better control for the sexual availability of mates (Penke & Asendorpf, 2008).

2.2.3 *Sociosexual Desire*

Penke and Asendorpf (2008) included this subscale in order to capture the motivational disposition of sexual desire (e.g., inclination for sexual fantasies involving a stranger). Contrary to general sexual desire, sociosexual desire is directly connected to the motivational tendency for finding short-term vs. long-term sexual partners (see

also Simpson & Gangestad, 1991). Additionally, the items include questions about sexual fantasies and personal arousal. The authors observed that this factor displays similar scores across participants with comparable relationship status. Thereupon, individuals in a relationship tend to be more restricted than when single, however they become less restricted after four years of relationship (Penke & Asendorpf, 2008). This subscale presented the largest gender difference.

2.3 Culture-Relevant Sociosexual Orientation

From an evolutionary standpoint, the reproductive demands of the environment are displayed into cultural values (Gangestad et al., 2006). This was the main motivation for Penke and Asendorpf (2008) to blur cultural beliefs into the sociosexual attitude subscale. From an evolutionary standpoint, more adverse environments should result in a faster LHS (Del Giudice, 2009) and hence higher sociosexuality (e.g., Olderbak & Figueredo, 2010). Nevertheless, regarding sociosexuality, this evolutionary account does not entail religious factors in relation to harsh ecologies. To this end, Botero et al. (2014) advocate that in adverse environments there is a higher prevalence of religious beliefs, since such environments elicit higher levels of cooperation to survive adversities (e.g., pathogen threat). Indeed, according to Schaller and Murray (2008), there is a negative relation between prevalence of infectious diseases and unrestricted sociosexuality, since regions which historically had higher prevalence of infectious diseases fostered more cautious approaches to sexual behavior (i.e., lower likelihood of engaging in uncommitted sex). Additionally, different data demonstrate that religious belief is positively related to pair-bond mating strategies (Shariff & Norenzayan, 2011) and willingness to cooperate (Shariff & Norenzayan, 2007), which are both inversely associated to fast LHS (Del Giudice, 2009; Ellis et al., 2009) and unrestricted sociosexual behavior (Olderbak & Figueredo, 2010).

Besides, even within the same culture, environmental demands may differ from individual to individual; thus, preserving intracultural variability (Buss & Greiling, 1999; Nettle, 2006). For instance, in large urban environments, uncommitted sexual relationships are more likely to remain unknown to society at large, while in smaller rural areas are harder to hide; thus, decreasing the individual's mate value and reducing the likelihood to engage in uncommitted coitus (Buss, 2005).

To exclude questions explicitly targeting cultural attitudes to sociosexual orientation, as done by Penke and Asendorpf (2008), may neglect environmental influences on individual sociosexuality. To interpret scores from a single culture is simpler than analyzing the scores collected from a multicultural sample (Heine, 2015). For instance, Festinger (1954) recognized that individuals tend to judge themselves in relation to similar others. In cross-cultural research, the reflection of this tendency on individual's responses is known as the reference-group effect (Heine et al., 2002), which is known to compromise the validity of cross-cultural studies (Peng et al., 1997). Hence, omitting items relative to cultural attitudes, the SOI-R may become limited in cross-cultural reproducibility and validity.

In virtue of this, we would like to contribute to the present literature on sociosexuality with our own version of the SOI-R by including cultural items. To emphasize this, we decided to call this new scale Culture Relevant Sociosexual Orientation Inventory (C-SOI). We define C-SOI as the individual willingness to engage in uncommitted sexual relationships independent of cultural influences. We believe that this way it will be possible to identify cultural response-biases more easily and increase the use of this construct in cross-cultural research.

3. Methods

A survey including our scale and other questionnaires was available online between March 14, 2021 and March 17, 2021. Despite initial reluctance, to the current date

web-based surveys proved to be as valid as paper-and-pencil ones (De Beuckelaer & Lievens, 2009; Gosling et al., 2004), including surveys aimed at sex research (Mustanski, 2001; Penke et al., 2006).

3.1 Participants and Procedure

Participants in this study were recruited at the researchers' convenience through social media and other electronic means (e.g., email, university sites, etc.). The only inclusion criterion was to be at least 18 years old. All statistical analyses were conducted using Jamovi (The Jamovi Project, 2021) and R (R Core Team, 2020). Pearson's correlation coefficients were used to describe the relationship between different continuous measures, while point-biserial correlation coefficients with dichotomous variables (e.g., gender). Between-group differences were analysed using the Student's *t*-test and the Mann-Whitney *U* test. Finally, data reduction was done utilizing principal component analysis (PCA).

The final sample was of $N = 71$ participants (69.01% females; 64.79% heterosexual; age: $M = 23.828$, $SD = 3.606$, range = 18–37). The demographics were left optional and at the end of the survey. Thus, participants who would not feel comfortable to disclose such information had the option to avoid it without having to withdraw from the study and/or bias their responses. All study participants provided their informed electronic consent approved by the ethical committee of the Empire State College, State University of New York (SUNY ESC) before completing the survey.

3.2 Materials

3.2.1 SOI-R

The SOI-R (Penke & Asendorpf, 2008) is a 9-item inventory for the assessment of sociosexual orientation. As extensively discussed, the SOI-R has three factors: Sociosexual Desire, Behavior, and Attitude. Each of these

factors is composed by a 3-item subscale on a 9-point Likert scale.

3.2.2 Three-Domain Disgust Scale

The Three-Domain Disgust Scale (TDDS; Tybur et al., 2009) is a measure for personal disgust across three dimensions: Moral, Pathogen, and Sexual Disgust. The TDDS is a 21-item scale and it has been previously used in contrast to the SOI-R (e.g., Al-Shawaf et al., 2015; O’Shea et al., 2019). We administered the TDDS to our participants to gather discriminant evidence about our scale.

3.2.3 C-SOI

The novel C-SOI is a 10-item inventory with four different subscales: Sociosexual Behavior, Desire, Personal Attitude, Cultural Attitude. The sociosexual behavior and cultural attitude are 2-item subscales, whereas the sociosexual desire and personal attitude are composed by three items. The items of the C-SOI are scored on a 7-point Likert scale ranging from 1 to 7.

Table 1.

Descriptives of the C-SOI, TDDS, and SOI-R

	C-SOI	TDDS	SOI-R
<i>N</i>	71	71	71
<i>M</i>	35.676	68.718	41.255
<i>SD</i>	12.282	16.995	15.513
Range	10–61	26–110	13–75
Shapiro Wilk’s <i>p</i>	.420	.588	.135

4. Results

Descriptive data on the three scales are displayed in Table 1. Pearson’s correlation coefficients of age and sexual orientation, as well as point-biserial for gender (male/female) with the C-SOI were calculated. Since no significant correlation has been found ($p > .05$), we did not stratify the sample accordingly. We also explored gender differences on the SOI-R (Penke & Asendorpf, 2008),

TDDS (Tybur et al., 2009), C-SOI and its subscales. Statistically significant differences were only found for the SOI-R, the TDDS, and the desire subscale of the C-SOI ($p < .05$; see Table 2).

Table 2.

Gender Differences on the SOI-R, TDDS, C-SOI

	Statistics	<i>p</i>	ΔM
C-SOI	-0.756*	.452	-2.495
Behavior	471.50**	.810	2.850e-5
Desire	-2.247*	.028	-2.495
Attitude	450.500**	.605	1.000
Culture	443.50**	.540	-1.000
TDDS	2.234*	.029	9.919
SOI-R	-1.998*	.050	-8.117

Note. *Student’s *t*; **Mann-Whitney *U*.

In line with Penke and Asendorpf’s (2008) findings, males were higher on the C-SOI and SOI-R. Similarly, in line with Tybur et al.’s (2009) findings, females scored higher on the TDDS. For the estimated marginal means see Table 3.

4.1 Criterion-Related Validity

As expected, our C-SOI was significantly and directly correlated with the SOI-R, $r(69) = .857, p < .001$, as well as being significantly and indirectly correlated with the TDDS, $r(69) = -.267, p < .05$, and the sexual disgust subscale of the TDDS, $r(69) = -.577, p < .001$.

4.1.1 Behavior Subscale

Items on the behavioral dimension of our C-SOI were significantly and indirectly correlated with sexual disgust subscale of the TDDS, $r(69) = -.289, p < .05$, whereas being significantly and directly correlated with the behavioral facet of the SOI-R, $r(69) = .818, p < .001$. Therefore, the behavior subscale attained criterion-related validity.

Table 3.

Descriptives of Gender Differences on the SOI-R, TDDS, C-SOI and its Subscales

	Group	<i>M</i>	<i>Mdn</i>	<i>SD</i>
C-SOI	Female	34.755	36	12.362
	Male	37.250	35.5	12.624
SOI-R	Female	38.633	40	15.806
	Male	46.750	47	13.988
TDDS	Female	71.469	72	14.620
	Male	61.550	62	21.157
Desire	Female	9.755	9	4.309
	Male	12.250	12.5	3.851
Behavior	Female	6.306	6	3.495
	Male	6.000	6	3.403
Attitude	Female	12.551	13	4.954
	Male	11.950	11.5	4.466
Culture	Female	6.143	6	3.096
	Male	7.050	6.5	4.211

Note. Female $N = 49$; Male $N = 20$.

4.1.2 *Desire Subscale*

Items on the desire dimension of our C-SOI were significantly and indirectly correlated with sexual disgust subscale of the TDDS, $r(69) = -.597, p < .001$, whereas they were significantly and directly correlated with the desire subscale of the SOI-R, $r(69) = .726, p < .001$. Therefore, the desire subscale attained criterion-related validity.

4.1.3 *Personal Attitude Subscale*

Items on the personal attitude subscale of our C-SOI were significantly and indirectly correlated with sexual

disgust subscale of the TDDS, $r(69) = -.517, p < .001$, as well as being significantly and directly correlated with the attitude dimension of the SOI-R, $r(69) = .804, p < .001$. Therefore, the personal attitude subscale attained criterion-related validity.

4.1.4 *Cultural Attitude Subscale*

Items on the cultural dimension of our C-SOI were significantly and indirectly correlated with sexual disgust subscale of the TDDS, $r(69) = -.324, p < .05$, while being significantly and directly correlated with the attitude facet of the SOI-R, $r(69) = .475, p < .001$. Therefore, the cultural attitude subscale attained criterion-related validity.

Furthermore, since culture-relevant questions are newly introduced items for the measure of sociosexual orientation, we conducted additional linear analyses. Hierarchical regressions were performed to observe whether the culture-relevant items would be a good predictor of SOI-R and C-SOI total scores independently of gender. Data were suitable for linear analyses. From the analyses, culture-relevant items could significantly predict C-SOI, $F_{model1}(1, 67) = 100.156, p_{model1} < .001, adj.R^2_{model1} = .593$, and it remained significant after controlling for gender, $F_{model2}(1, 66) = 49.861, p_{model2} < .001, adj.R^2_{model2} = .590 (\Delta adj.R^2 = .003)$. Similar results were obtained for the second linear model. Indeed, culture-relevant items could significantly predict SOI-R, $F_{model1}(1, 67) = 32.530, p_{model1} < .001, adj.R^2_{model1} = .317$, and it remained significant after controlling for gender, $F_{model2}(1, 66) = 18.211, p_{model2} < .001, adj.R^2_{model2} = .336 (\Delta adj.R^2 = .019)$. Gender was in both models an insignificant predictor. Hence, culture-relevant items play a pivotal role in explaining sociosexuality.

4.2 Content Validity

The content validity for the items on our scale has been conducted with three panelists from SUNY ESC. Items with a content validity ratio (CVR) above 0 were considered appropriate and, thus, included in our final

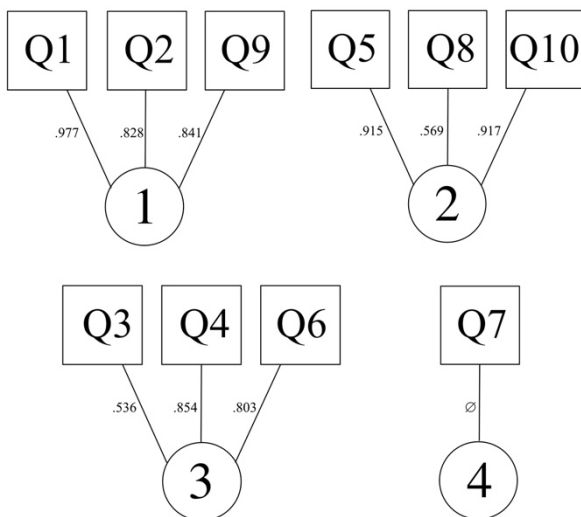
questionnaire. Each item has received a score of 1, aside from Question 9 (i.e., “The number of sexual partners I have had would be considered high in my culture”) which received a score of .33. In virtue of the ratings received by the three panelists, we included all the ten items.

4.3 Construct Validity

The ten original items of the C-SOI were suitable for data reduction and thus subjected to PCA with an oblique rotation. Additionally, we decided a priori to discard items loading below .4 and, in case of cross-loadings, to prioritize those items loading more than .65, since it is the recommended value for our sample size ($N = 71$; Hair et al., 2010). Indicating four latent variables, the PCA using a promax rotation offered unsatisfactory results. Even though no cross-loading appeared, only one item (Question 7; i.e., “I believe that marital sex is preferable to uncommitted sexual behavior”) loaded on the fourth factor (see Figure 1). Reliability analyses did not flag any particular issue ($\alpha_{total} = .832$, $\alpha_{item-dropped} = .832$), nor did CVR for this item ($CVR = 1$). Nevertheless, we decided to remove this item from the final questionnaire and analyses.

Figure 1

Principal Component Analysis for the 10-Item C-SOI

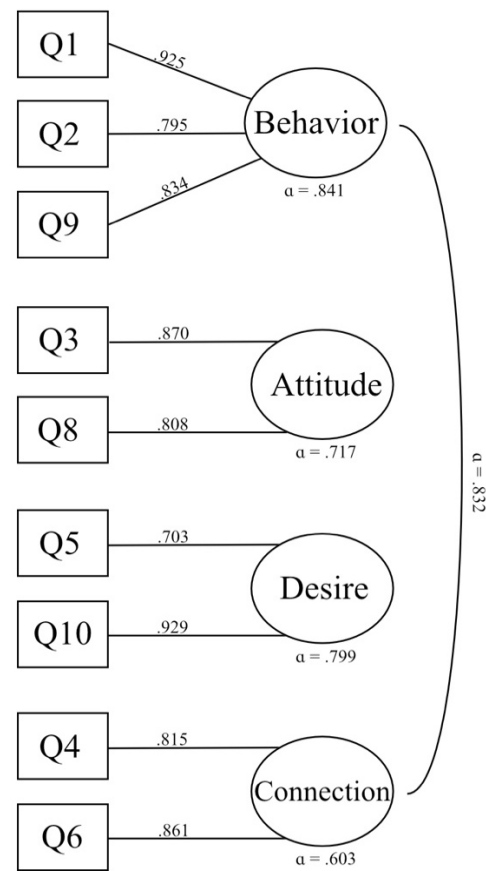


Note. A promax rotation was used; Loading > .5.

After deletion, the data remained valid for reduction. A second PCA using promax rotation now confirmed our four factors solution. No cross-loading appeared and each item loaded as recommended (> .65; see Figure 2). This convinced us to establish the final C-SOI as a 9-item four factors measure. We named the factors as “behavior”, “attitude”, “desire”, and “connection”. The correlation coefficients can be found in Figure 3.

Figure 2

Principal Component Analysis for the 9-Item C-SOI



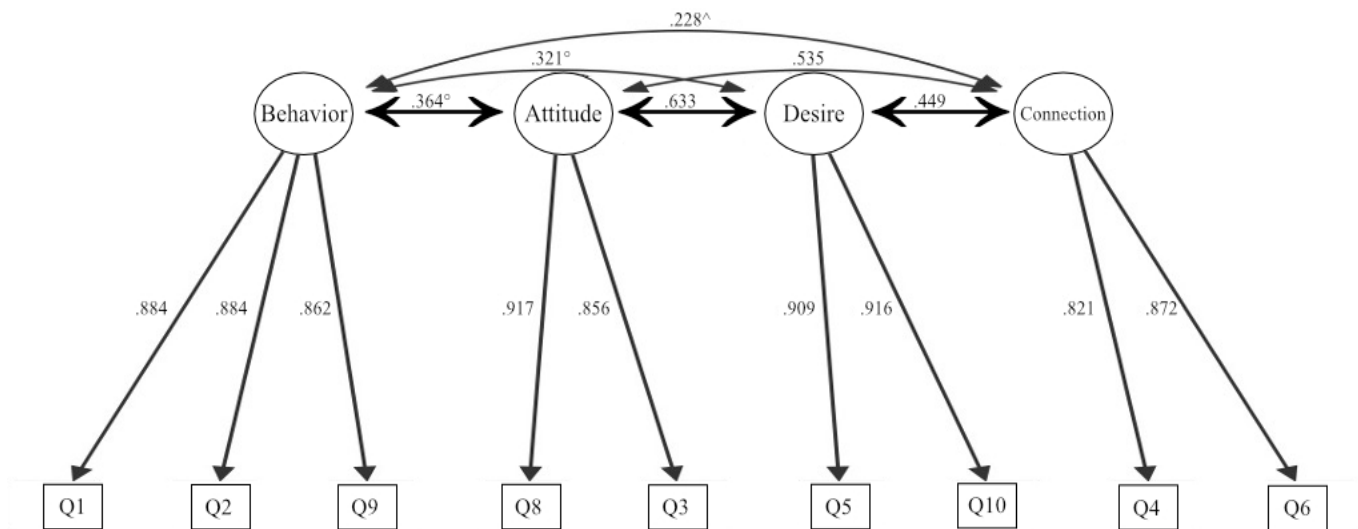
Note. A promax rotation was used; Loading > .5.

4.4 Internal Consistency

Cronbach’s alpha was calculated for the items on our C-SOI (see Figure 2). A Cronbach’s alpha coefficient > .7 is considered high (Nunnally, 1994). We achieved high internal consistency for the C-SOI and the behavior and attitude subscales, as well as an acceptable internal consistency for the desire facet.

Figure 3

Pearson Correlation Coefficients of the 9-Item C-SOI



Note. $^\circ = p < .01$; $^\wedge = p > .05$; the rest of the correlation coefficients are $p < .001$

4.5 Test-Retest Reliability

Between the 27th and the 29th of April 2021 we administered again our C-SOI in order to determine test-retest reliability. From the original sample ($N = 71$), we were able to collect data from 33 participants only. To determine reliability, we used Pearson correlation coefficients. The two total scores were significantly and directly correlated, $r(31) = .86, p < .001$. Hence, the C-SOI displayed test-retest reliability.

5. Discussion

Our results strongly supported our initial idea that culture contributes to the construct of sociosexuality and our final 9-item four-factor scale achieved satisfactory results (see Figure 2). In line with previous studies (Penke & Asendorpf, 2008; Tybur et al., 2009), gender differences were significant for the desire subscale of the C-SOI, TDDS, and SOI-R as expected. Correlation analyses also confirmed the validity of our scale and its subscales. Particularly, the cultural facet of our C-SOI proved to be uniquely correlated with the sexual disgust subscale of the TDDS and the attitude facet of the SOI-R even when controlling for gender. Also, culturally oriented questions

were a stronger predictor than gender of SOI-R final score; thus, confirming the unique contribution that culture-relevant questions play in the final sociosexuality score.

The initial PCA did not bring expected results. After attentive reevaluations, we comprehended that Question 7 (i.e., “I believe that marital sex is preferable to uncommitted sexual behavior”), even though it resembles SOI-R’s Item 6 (i.e., “I do not want to have sex with a person until I am sure that we will have a long-term, serious relationship”), could tap into other facets involving religious belief and attitude toward marriage. Hence, we decided that to drop this item was more suitable than to reword it. The final PCA confirmed our decision, thereby showing strong loading values ($> .65$) and satisfactory internal consistency.

The four factors we obtained were also not as expected. Indeed, culture-relevant questions appeared to load on the behavior and desire categories. Nevertheless, even though we did not obtain a cultural attitude factor, we believe that this result does not compromise our final C-SOI. Indeed, our operational definition was that the C-SOI should measure the individual willingness to engage in uncommitted sexual relationships independent of cultural

influences. Conversely to Penke and Asendorpf (2008), our main goal was to include culture-relevant questions because of their extreme importance in cross-cultural (Heine, 2015; Heine et al., 2002) and evolutionary studies (Al-Shawaf et al., 2015; Buss & Greiling, 1999; Nettle, 2006). Thus, the observed blending of culture-relevant items with other items, together with the fact that they are a strong predictor of sociosexuality independently of gender, in truth, further reinforces our proposition of including cultural factors in the measure of sociosexuality.

The novel “connection” subscale of our C-SOI could appear confusing at first. This factor is comprised by Questions 4 and 6 which are, at first glance, similar to Items 4 and 9 of the SOI-R (i.e., “Sex without love is OK” and “In everyday life, how often do you have spontaneous fantasies about having sex with someone you have just met?”). Indeed, sociosexual desire as defined by Penke and Asendorpf (2008) in their SOI-R, as well as by Simpson and Gangestad (1991) in their SOI, considers the inclination for sexual fantasies involving a stranger. Considering this, we understand that the connection subscale of our C-SOI could appear unnecessary. However, we believe that by including culture-relevant questions, as well as administering our measures to a multicultural consortium, this subscale is on point.

When considering sociosexual inclinations toward strangers, it is important to consider how cultural ingroup vs. outgroup boundaries are defined. Considering the work of Markus and Kitayama (1991), it must be mentioned that for those with an interdependent self (e.g., East Asians) the boundary between ingroup and outgroup is very firm. Conversely, for those with an independent self (e.g., North Americans) the same boundaries are much more fluid. Therefore, for someone with an interdependent self, strangers are consistently excluded from the ingroup boundaries (Heine, 2015; Markus & Kitayama, 1991); thus, people feel for and pay far less attention to strangers (S. Han & Humphreys, 2016; Ma-Kellams & Blascovich,

2012). For those with an independent selfhood the confines between groups are more in flux. Indeed, attention to strangers is more common and it can prove adaptive in the context of more frequent networking (Markus & Kitayama, 1991). For these reasons, the connection subscale of the C-SOI can provide a more accurate report of sociosexuality. Specifically, it reduces potential confounding elements (e.g., the influence of culturally sanctioned ingroup/outgroup boundaries) because of disjoining the relevant questions from the other scales.

5.2 Limitations

This research has received no funding, thereby making the process of participants’ recruitment challenging, as well as impeding the use of resources and facilities that could have aided us when collecting and analyzing data. Also, because of limited resources, our sample had to be of convenience, thereby raising potential methodological issues. Also, time restrictions limited the ability to collect more participants. A period of ten weeks, which was the time in which we were expected to deliver our results, was not adequate to create the type of research that we would be satisfied with.

Future research should attempt to replicate and evaluate our findings with larger multicultural samples. With more representative samples it will be possible to observe even more culture-relevant sociosexual nuances than those we could observe in our initial study.

6. Conclusion

The results acquired through this research support the relevance of the C-SOI due to the lack of a culturally relevant sociosexual scale. Our findings also demonstrate that the C-SOI has significant psychometric qualities. In relation with previous measures (Penke & Asendorpf, 2008; Simpson & Gangestad, 1991), our results provide evidence of the influence that culture has on sociosexuality. Such findings allowed us to validate our C-SOI and to

demonstrate its utility in cross-cultural and cultural research.

7. Culture Relevant Sociosexual Orientation Inventory (C-SOI)

Q.1–2 = 0, 1, 2–3, 4–5, 6–7, 8–9, 10 or more.

Q.3–5 = Never (1) – Always (7).

Q.6–10 = Strongly disagree (1) – Strongly agree (7).

1. With how many different people have you had a one-night stand?

2. With how many different people have you engaged in sexual activities without being interested in a committed relationship?

3. How often do you experience sexual arousal when in contact with a person with whom you are not interested in having a committed relationship?

4. How often do you experience sexual fantasies with a stranger?

5. How often do you find yourself wishing for more uncommitted sexual relationships?

6. Establishing an emotional connection is a necessary prerequisite for sexual activities.

7. I believe that marital sex is preferable to uncommitted sexual behavior (Item deleted in the final version).

8. I can imagine being involved in a sexual relationship without commitment.

9. The number of sexual partners I have had would be considered high in my culture.

10. I would prefer to engage in more uncommitted sexual activities than what is acceptable in my culture.

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Modern Inhaler for Depression-induced Panic Attacks

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Abstract

Depression is one of the most common mental disorders in the world, affecting over 264 million individuals. The main cause of depression is mood swings caused by daily struggles. Depression is a chronic psychiatric problem that can lead to suicide in moderate and extreme cases. Suicide became one of the leading causes among young people and annually more than 800 000 people die. The symptoms of panic attacks are a feeling of losing control, sweating, trembling, shaking, nausea, and shortness of breath. Panic disorder and depression are closely aligned and intertwined, and the factors that predispose a person to one condition may also put them at risk for the other. Most people from middle and low-income countries do not receive treatments for this disorder. The final output of the research paper suggests a mechanism of modern inhalers that containing essential oil/solvent to emotionally change mood during depression-induced panic attacks.

Keywords- Olfactory system, Limbic system, Depression, Linalool, Essential oil

The Purpose of the Study

According to brain chemistry when the nerve signal passes through the limbic system to the olfactory cortex, it causes mood changes and regaining memories. Previous studies prove that Linalool is a chemical component of essential oil. It works via serotonin-1A receptors in the brain, reducing their binding potential so that levels of free serotonin and related neurotransmitters rise, resulting in reduced anxiety. The Limbic System is the most primitive

part of the brain concerned with survival instincts and emotions. The final output of the research paper suggests a mechanism of modern inhalers that containing essential oil/solvent to emotionally change mood during depression-induced panic attacks.

Materials and Methods

Severe depression causes a social anxiety disorder and the people who are suffering from the general

anxiety disorder have more possibility to have recurrent panic attacks. Physical symptoms during a panic attack are; pounding or racing heart, sweating, chills, trembling, breathing problems, weakness or dizziness, tingly or numb hands, chest pain, stomach pain, and nausea. The common risks for social anxiety disorder are negative life experiences, unproductive personality traits, and unusual patterns of activity in the brain. Patients who are suffering from both panic disorder and depression have been intensively careful about themselves and overcome it. Some people had panic disorder first and then depression while others have depression prioritize panic disorder. It happens suddenly and surprisingly and leaves the men and women who experience them mystified about what has happened. Patients feel early panic attack symptoms recurrently until diagnosed with the panic disorder. Early panic attacks show up when the depression level is at the initial stage. At the moment panic disorder is diagnosed, the depression level will be intensive. It must be emphasized that this pattern of development is not universal. But its prevalence reveals that panic disorder and depression are closely aligned and intertwined, and the factors that predispose a person to one condition may also put them at risk for the other. The symptoms of panic disorder and depression are distinct, but both symptoms amplify each other simultaneously at certain circumstances and make troubling psychological effects. people who experience panic disorder and depression together must seek treatment from physicians or mental health care providers, based on the debilitating capacity of their symptoms and sometimes they require hospitalization or other forms of intensive medical care since there is a capability for them to contemplate or attempt suicide⁽¹⁾

1. The Olfactory System and the Limbic System

The first cranial nerve is the olfactory nerve and it transmits visual information about the smell. The olfactory receptor neurons' afferent nerve fibers relay nerve signals around odors to the central nervous system (olfaction). The olfactory nerve's specialized olfactory receptor neurons are found in the olfactory mucosa of the upper nasal cavity. The olfactory nerve begins on the caudal surface of the olfactory bulb and it crosses the cribriform plate of the ethmoid bone from one side of the crista Galli process to the other to enter the olfactory zone of the nasal cavity. The olfactory nerve roots are superior to the optic nerve's base and the anterior cerebral artery on the caudal side. When the axons migrate into the subarachnoid space, they are collected into small bundles. They are sheathed in pia mater and cross the foramina of the cribriform plate. The olfactory nerve, which runs from the nasal mucosa to the forebrain, is the smallest of the cranial nerves. It reaches the skull through the ethmoid bone's cribriform plate. It then sends signals to different brain areas, like the temporal lobe, amygdala, and entorhinal cortex, to be processed. ⁽²⁾

Aromatic molecules decompose into gases that disperse rapidly, making them volatile. Micro aromatic molecules in inspired air with differing physical, chemical, and electrical properties penetrate the nasal epithelium in the nasal cavity during inhalation and stimulate receptors, resulting in the sense of smell.

Such stimulants are converted to electrical stimulation in the olfactory neurons, which then send these impulses to the olfactory bulb, where they are sent to the olfactory regions of the brain and Limbic System through the olfactory tract. The Limbic System is the brain's most primal portion, where survival instincts and impulses are dealt with. As a nerve impulse travels from the limbic system to the Olfactory cortex, it triggers mood swings and memory retrieval, according to brain chemistry. The scent is eventually heard, but the brain and body have already reacted to it. ⁽³⁾

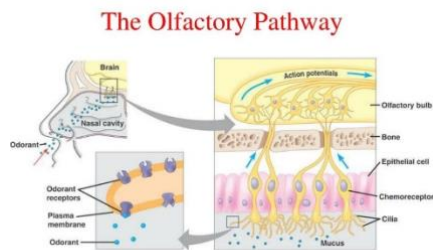


Figure 01. The Olfactory Pathway

Paleomammalian cortex is another name for the limbic system. It is mainly found in the forebrain on both sides of the thalamus, directly under the medial temporal lobe of the cerebrum. The limbic system is an emotional system that controls behavior, motivation, long-term memory, and olfaction, among other things. Lower-order emotional regulation of information from sensory structures with a primordial structure is handled by the limbic system. The amygdaloid nuclear complex (amygdala), mammillary cores, stria medullaris, middle grey, and dorsal and ventral nuclei of Gudden make up the amygdaloid nuclear complex (amygdala). The prefrontal cortex, cingulate gyrus, limbic thalamus, hippocampus, along with the parahippocampal gyrus and subiculum, nucleus accumbens, anterior hypothalamus, ventral

tegmental region, midbrain raphe nuclei, habenular commissure, and entorhinal cortex are several of the structures associated with this relevant data from the telencephalon. The limbic system is divided into several parts, each of which performs a different function. The amygdala records memories and associates them with feelings while the cingulate gyrus connects different areas of the limbic system together, creating pathways for information and brain messages to travel across. The hypothalamus formed the hormones therefore it is one of the most important parts of the limbic system. ⁽⁴⁾

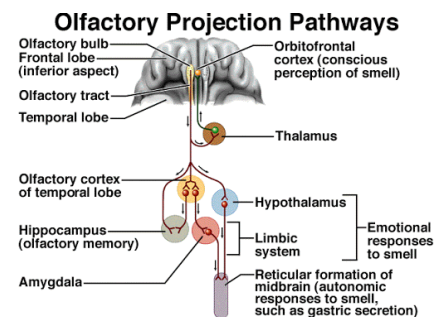


Figure 02. Olfactory projection pathways

2. The Methodology of the Modern Inhaler

The inhaler is a portable device for administering a drug which is to be breathed in. There are three major components, a canister, a metering valve, and an actuator. The canister contains an oil/solvent mixture. Because of that, it's made of titanium or stainless steel. For each actuation of the metering valve, a metered volume of the formulation is distributed. an actuator (or nosepiece) that enables the patient to use the system and guides the vapor into the olfactory area of the patient. The mating discharge nozzle is installed in the actuator, which usually has a dust cap to avoid pollution. To use the inhaler, patients must press down on the top of the canister while supporting it with their thumb. By actuation, the system delivers a single metered dose

of the drug, which includes the medication containing volatile in the propellant. The propellant disperses into particles. Due to the rapid moisture of these droplets, an aerosol containing micrometer-sized drug molecules is formed, which is then inhaled.

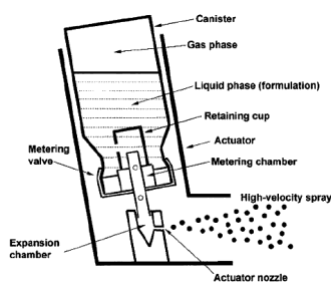


Figure 08: Graphic image of the modern inhaler.

3. Chemical Properties of Linalool as a Component in the Essential Oil

Inhaling essential oils is the fastest route into the body for essential oils. The amount that gets absorbed depends on the essential oils 'bioavailability', anywhere from 30% - 70% is actually absorbed into the body. Therefore it is necessary to look into a patient's requirements when selecting essential oils.

Linalool is a biologically active terpene alcohol that presents in many flowers and spice plants that come in two enantiomers ((S)-linalool and (R)-linalool). It has a variety of retail uses, which are dependent on its good smell (floral, with a touch of spiciness). The essential oils of coriander (*Coriandrum sativum* L.), Cymbopogon (*Cymbopogon martini* var. *martinii*), and sweet orange (*Citrus sinensis*) flowers contain the (S)-linalool enantiomer as the main constituent. Lavender (*Lavandula officinalis*), bay laurel (*Laurus nobilis*), and sweet basil (*Ocimum basilicum*), among other plants, contain the (R)-linalool

enantiomer. Licareol is another name for (R)-(-)-linalool, while coriander is another name for (S)-(+)-linalool. ⁽⁵⁾

4. Essential Oils which Contain Linalool

4.1. Coriander Oil

Coriander is a perennial herb in the Apiaceae family with the scientific name *Coriandrum sativum*. Herbal medicine uses all aspects of the plant, but the fresh leaves and dried seeds are the most valuable. The plant reaches a height of 50 cm (20 in) and has a variety of leaf shapes, with thick lobed leaves at the base and narrow and fibrous leaves higher on the flowering stems. Coriander oil is extracted from the leaves using a variety of methods, including hydrodistillation and solvent extraction. ⁽¹¹⁾

4.2. Lavender Oil

Lavender essential oil is produced through steam distillation from the flower spikes of certain species of lavender. There are two major types of lavender oil which are known as Lavender flower oil and lavender spike oil. *Lavender flower oil* is a colorless and insoluble oil in water. The density of *lavender flower oil* is 0.885 g/mL. *Lavender spike oil* is a distillate from the herb called *Lavandula latifolia* and the density of the oil is 0.905 g/mL. ⁽¹²⁾

4.3. Peppermint Oil

Peppermint is a hybrid mint between watermint and spearmint (*Mentha × piperita*, also known as *Mentha balsamea* Wild).⁽¹³⁾ The length of the Peppermint plant is 30–90 cm (12–35 in) and contains smooth stems, square in cross-section. The leaves can be 4–9 cm (1.6–3.5 in) long and 1.5–4 cm (0.59–1.57 in) broad. The method of oil extraction is steam distilled from leaves and flower buds. ⁽¹⁴⁾

4.4. Sweet Basil Oil

Sweet Basil is known as *Genovese basil* which is the culinary herb of the family Lamiaceae (mints). The length of the plant is between 30 cm (0.98 ft) and 150 cm (4.9 ft). Leaves are richly green and ovate, but sometimes they come in a wide variety of sizes and shapes which is depending on the cultivar. Sweet basil oil is produced through steam distillation from the basil leaves. ⁽¹⁵⁾

Studies and Results

The terpene appears to reduce the fight or flight response and change the firing of serotonin receptors which support Linalool to produce an anxiolytic effect. According to the data of the research done by *The International Journal of Neuropsychopharmacology* to investigate the effects of lavender essential oil on the human brain, Linalool helps to combat anxiety by increasing parasympathetic activity. Each of the three divisions of the autonomic nervous system is the parasympathetic nervous system. When active, this branch, also known as the "rest and digest mechanism," lowers heart rate, increases bowel function, and relaxes some muscles.

The research has been done by a randomized, blinded, placebo-controlled trial involving 17 healthy volunteers. The subjects were instructed to take a quantity of 160mg patented lavender essential oil product every day for eight weeks. After the eight weeks, researchers used positron emission tomography and magnetic resonance imaging to examine the participants' brains. They found decreased binding potential at the 5HT1A receptor—a type of serotonin receptor—in two regions of the brain. Previous neuroimaging studies suggest that excessive firing at this receptor site could be a contributing factor to anxiety. These

findings suggest that linalool exerts anxiolytic effects by decreasing serotonin receptor activity. ⁽⁶⁾

The very odor of linalool might be enough to reduce anxious activity within the brain, as displayed in a 2018 study conducted in Japan which was about odor of the Linalool and its effect in the mice. As the final result, they found linalool produces an anxiolytic effect in mice, without compromising motor activity and they recognize the clinical application of linalool can be used as a treatment of anxiety. Linalool produces these effects by acting on GABA_A receptors, at the same site targeted by the benzodiazepine class of anxiolytics.

Another study found that inhaled linalool increased social interaction and decreased aggressive behavior in mice. Researchers noted that the terpene impaired memory, but only at higher doses. Linalool exerts antidepressant-like effects through the monoaminergic system—a network that includes the dopaminergic and serotonergic systems. Linalool affects autonomic nerves through a histaminergic response, then decreases lipolysis and heat production (energy consumption). ^{(7) (8) (9)}

Linalool activates H3-receptors, which suppress sympathetic nerve function and lipolysis. The lipolytic contributions to Linalool are mediated by the hypothalamic suprachiasmatic nucleus and histamine neurons, and tyrosine phosphorylation of BIT (a brain immunoglobulin-like molecule with tyrosine-based amplification motifs, a component of the signal-regulator protein family) is involved in the transcription factors. ⁽¹⁰⁾

Conclusion

Severe depression causes a social anxiety disorder and the people who are suffering from the general anxiety disorder have more possibility to have recurrent panic attacks. Patients who are suffering from both panic disorder and depression have been

intensively careful about themselves and overcome it. Some people had panic disorder first and then depression while others have depression prioritize panic disorder. It happens suddenly and surprisingly and leaves the men and women who experience them mystified about what has happened. Patients feel early panic attack symptoms recurrently until diagnosed with the panic disorder. Panic disorders occur due to mood swings. This research paper explained the way to relax the mood during panic attacks by activation of an olfactory system. The olfactory nerve, which runs from the nasal mucosa to the forebrain, is the smallest of the cranial nerves. It reaches the skull through the ethmoid bone's cribriform plate. Then it sends signals to different brain areas, like the temporal lobe, amygdala, and entorhinal cortex, to be processed. According to brain chemistry when the nerve signal passes through the limbic system to the olfactory cortex, it causes mood changes and regaining memories. Then aroma finally is recognized but by this time the brain and body already have responded to it. The Limbic System is the most primitive part of the brain concerned with survival instincts and emotions. Linalool is a chemical agent of essential oils that works via serotonin-1A receptors in the brain, reducing their binding potential so that levels of free serotonin and related neurotransmitters rise, resulting in reduced anxiety. As a final output of the report suggests a modern inhaler that contains essential oil/solvent. By actuation, the system delivers a single metered dose of the solution, which includes the medicine dissolved or suspended in the propellant. The propellant disperses into droplets. Due to the rapid moisture of these small particles, an aerosol containing micrometer-sized drug molecules is formed, which is then inhaled. The modern inhaler is portable and useful to change the mood of patients during panic attacks.

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Date Rape: Perception and Influence on the Future Relationships of Victims

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Abstract

Rape is a global issue, and a subset of this punishable act is referred to as date rape, which occurs once an individual forces themselves upon another human being without their consent, within an intimate relationship, therefore performed by a partner or a date. In many cultures, this criminal act is deeply hidden and not discussed, although affecting the society at large. Due to the sensitive relationship of the rapist and the victim, many do not report the crime to law enforcement. Statistics are potentially inaccurate, and underestimated, since many do not perceive themselves as a survivor of date rape, and tolerate sexual aggression behind closed doors. Also, victim blaming or being ridiculed by the society contributed to the victims fear to speak up. Study has shown, that victims of date rape suffer from physical as well as mental problems. Injuries may vary, based on the amount of violence performed against the partner, from minor to severe injuries. In this research, three hypotheses were addressed. One showed that the impact of date rape on victims future forming of relationships is significant. Furthermore, a professional has the power to help the victims of date rape with shifting their perception on forming future relationships. Other results show the perception on the definition of date rape and which scenario participants consider as this criminal act. The main aim is to spread awareness, and motivate direct victims to come forward, and individuals that have the knowledge of somebody experiencing sexual aggression with their partner, to reach out to them to provide help and support.

Keywords: perception, date rape, future relationships, professional help, awareness

1. Introduction

Rape is an illegal sexual assault and typically sexual contact performed physically, while forced upon an individual against their will under the fear of harm, or with an individual who is under a certain age or unable of valid approval due to mental disorder, mental disability, alcohol or drug overdose, unconsciousness, or manipulation by the offender (Merriam-Webster , 2021). The group with the highest rates of rape are adolescent women (Baker, 2006),

and rape is feared by females under the age of 35 more than a robbery, assault or even murder (Sawtell, 2008). Rape has multiple variations, and one of them that this research is based on is referred to as date rape, which commonly occurs in today's society. It is a sexual activity forced upon an individual by their partner. As stated by the Rape Crisis Network Europe (2021), perpetrators are more often known and trusted by the victim, even within an intimate relationship, which makes the rapist a boyfriend, husband or an intimate partner. Due to this specific victim-

perpetrator relationship, victims often do not characterize their experience as a criminal act- rape (Black & Gold, 2008). This should not be overlooked due to the nature of this widespread and tenacious problem, consistently and detrimentally affecting the society (Watson , Kovack , & McHugh, 2012). Furthermore, victims of rape may experience future problems with their mental health, in example, Rape Trauma (RT) is one of the most often occurring outcome of a forced sexual intercourse.

This research was conducted to see whether professionals do have the power to help the victims after experiencing trauma, and if they can help them with their perception of forming future relationships. Moreover, we find it crucial to know the perception on date rape from various participants (e.g., non-bias participants) as well as the different opinions based on gender. Most of all, our aim is to provide awareness to this type of rape as well as possibly change the perception of individuals, which do not see being raped by a partner as a “real” criminal act. We want to show, that these events happening behind closed doors are, in fact, making a difference in one’s life. Mistakenly, many think that rape may only occur once a male forces himself upon a female. Rape as well as date rape, happens also, once a female forces herself upon a male. This study aims to motivate individuals and victims to raise their voice, find help, or inspire a person they know of, who is in possible danger of forced sexual activities in their relationship.

2. Literature Review

2.1 Definition of Rape

Rape lies on the vicious, brutal an extreme end of the scale of aggressive sexually driven criminal acts, which includes at least some sexual arousal. Specific type of sexual assault, referred to as rape is accomplished by the usage of psychological or physical force, to perform a

sexual intercourse, which includes forced anal, oral and/or vaginal penetration, with a body part or an item (Baker, 2006). Rape is a crime where there is an attack present on the psychological, social, and physical comfort of the victim. Rape includes acquired behavior, when the offender tries to win control and maintained power over the victim, while not being concerned about the victim’s well-being, and the sexual act often intensifies in seriousness and density (Carretta, 2011). For each time that a rapist is caught, they already usually have raped a human being approximately 14 times, and with each time, they get more inhumane and violent (Bliss, 2013). Unfortunately, rapists exploit powerful drugs like the combination of alcohol, GHB (Gamma Hydroxybutyrate) and Rohypnol, which are both frequently used “club drugs”. They are famous for their effects on the user since they prevent them from resisting any type of sexual force. In most cases, the victims might be unable to refuse and may feel physically helpless. The trend of rape has increased by 87.33% (from 2,487 in 1971 to 24,206 in 2011) especially since the abusers and sexual predators have it easier with the usage of intoxication of the victims with all the possible substances (Kumar, 2013). According to Sawtell (2008), women have a 26% probability of being a victim of fully completed rape in their lifetime, and 46 % probability to be victims of attempted rape throughout their life.

2.1.1 Date Rape

Depending on the culture, dating relationships around the world vary from one another. One of the occurring issues within the relationships is sexual aggression towards a partner, including unwanted sexual relations, accomplished by a date, friend or a partner, which is referred to as date rape. Acquaintance rapes are around 13%-27% among college-age women and 20% to 68% among adolescents. Date rape plays a big role however, it

is only a subset of acquaintance rape where non-consensual intercourse occurs between two individuals who are in a romantic or purely sexual relationship (Kumar, 2013). In the U.S., approximately 75% of reported rapes were forced by someone known to the victim. Due to the sensitive relationship of the rapist and the victim, many do not report the crime to law enforcement. Therefore, many statistics that have been conducted are potentially underreported and underestimated (Sawtell, 2008). Many do not differ from the term “rape” and “date rape”. The most common perception of what is rape, is that it is performed by a stranger, when a woman is jumped in the middle of the night in a dark alley, left with multiple injuries, that get treated and reported to the law enforcement. Due to this perception, many do not try to reach out for help, since they do not feel as “real” victims. A victim may proceed in sexual interaction, due to the fear of what the partner might do, if they do not comply in sexual intercourse, while being forced to do something humiliating and degrading (World Health Organization, 2005). Additionally, 70% of students at a college level experienced sexual persistence, even after refusing sexual activities, e.g., manipulation to obtain sex, taking advantage while the victim is intoxicated, physical force and continuing to arouse the victim (Yarber, Sayad, & Strong, 2010). Unfortunately, women are still one of the most vulnerable victims in several areas of crime.

2.2 Outcomes of Rape

Rape impacts the victims in multiple ways. Depending on the severity of the attack, the victims can experience physical injuries as well as develop mental health problems.

2.2.1. *Physical Outcomes*

More than half of the victims, that report rape to the police, are treated by a healthcare professional due to the

injuries (Baker, 2006). People attacked by a stranger are more likely to develop more severe physical injuries compared to the victims of intimate partnership rape (Carretta, 2011). Regarding date rape, outcomes may vary from light to acute injuries. Many victims may experience sexually transmitted diseases, trauma to the rectum, vagina, perineum, tears, laceration, and perforation (Chinlumprasert, 2000). Physical injuries can also include infections of the urinary track, pregnancy, internal damages, bruising, fatigue, headaches and problems with appetite or sleep (Watson, Kovack, & McHugh, 2012). When rape is in place, the victims may experience a temporary motor paralysis, also known as Tonic Immobility, which includes suppressed vocals, they may experience extreme cold all over their body, the insensibility to ache, numbness, and the inability to call out (Lexington, 2007).

2.2.2 *Psychological Outcomes*

A person who experienced even unsuccessful rape attempt can still develop a degree of psychological trauma. Psychological problems include low self-esteem, fear, anxiety, depression, anger, PTSD (post-traumatic stress disorder), interpersonal and intrapersonal problems, difficulties with future intimate relationships, self-destructive behaviors, suicide attempts, neglect of themselves, substance abuse, sexual dysfunction or prostitution (Chinlumprasert, 2000), excessive worrying, irritability, difficulty with sleep and RT (Carretta, 2011), hypervigilance, problems with future romantic relationships, nightmares, emotional apathy and vivid flashbacks (Bliss, 2013), which are triggered by a smell, situation or a sound (Rape Crisis Network Europe, 2021). Pain, suffering and diminished quality of life have been closely connected to date rape (Carretta, 2011). In many cases eating disorders and body image disturbances occurs.

Based on Chinlumprasert (2000), fear and anxiety belong to the major psychological outcomes of forced sexual intercourse by a partner. According to the Rape Crisis Network Europe (2021), victims may be in shock, be in disbelief, feel physically sick, feel responsible, lose trust in themselves, feel worthless, dirty, and self-hated, be short-tempered with others, experience relationship and sexual difficulties and be afraid of places, people or of being alone.

2.3 Perception of Date Rape

Based on Watson, Kovack, and McHugh (2012) nearly everybody knows an individual that has been sexually assaulted or raped, since one in five women are in the danger of experiencing rape in their life. They also suggest that sexual assault implants power in men and fear in women. Often, victims instead of going to report the crime, they start to think that being forced into sexual activities is usual in a relationship. The reason of appearance of such cases can be explained by the perception of non-bias individuals. Victims of date rape are more often blamed than the victims of the stranger rape. An example of a non-biased view can be: “She/he chose to date this man/woman”. However, men are less punitive towards the perpetrators and assign more blame to the victim than do women. Women are more likely to describe a date rape as a crime than men. One reason why, men, are more blameful towards the date rape victims is due to the fact, that men are more likely to accept rape myths/scripts which justify rape. Examples of rape myths can be: “If someone gets really drunk, it’s their own fault if they end up getting raped. They should have kept themselves safe”, or “Girls who say no don’t really mean it” (Black & Gold, 2008). Sexual scripts and myths are mostly gender-biased. They are influenced by a sexual double standard, where men are praised for sexual activity, while women are criticized for the same sexual activities (Kreager & Staff, 2009).

Unbalanced power dynamic within a relationship may lead to insensitive actions, including dating sexual abuse or any type of physical abuse (Vázquez, 2013). Mostly, the dominant behavior of males and the submissive behavior of females. In a study focusing on the perception of date rape within Thai students, 44% of male participants and 46% of female participants did not accept the term “rape” in a relationship. They argued, that as soon as a woman is involved in some level of romantic relationship or had some degree of emotional connection with the man, forced sex is not perceived as rape. Moreover, 70% of participants perceived date rape situations tolerated and accepted by the society. This study also, showed that women are more concerned about the occurring of date rape than men (Chinlumprasert, 2000). One of our hypotheses is focused on the perception of males and females, as victims and also as non-biased individuals, to see whether the perception nowadays changed and if many feel that date rape is not considered a criminal act based on their perception.

2.3.1 Victims and Perpetrators

As police reports are not precise due to the underreported issue, it is complicated to determine the amount of date rapes forced by women and the amount of date rapes forced by men. Males can also be rape victims, although it is much rarer, since only 9% of rape victims are men (Bliss, 2013). Female sex perpetrators, that have been convicted count for only 1%, but the real number may be higher due to the bias, rape myths and false statistics due to underreporting and the few studies, that focused on female rape perpetrators show, that most of them are white, are in low socioeconomic class and unemployed (Bliss, 2013). In Africa, many men that are victims of partner sexual violence, and report the crime to the authorities usually have to face social stigma, stereotypical attitudes, and are often ridiculed. For a long time, it has been recognized, that

men and women are equally likely to be in the position of perpetrators as well as victims (Tsiko, 2015). Although academic work on sexual violence performed on men is slowly increasing, it still hasn't reached high levels. These incidents shake many of us to the core whether the victim is male or female. Our aim is to show, that not only women, but also male victims exist behind closed doors as well as perpetrators.

2.4 Psychological Help

As mentioned in section 2.1.1, many victims do not come forward with the crime. They may blame themselves, as well as be afraid of the abuser or of being disbelieved or blamed by many others. Victims often try to keep this situation a secret. Unfortunately, holding inside all the secrets and emotions only causes harm. If you are feeling any of the psychological or physical outcomes of date rape, it is important to ask for help (Rape Crisis Network Europe, 2021). One of the most important factors in coping from stressful situation as well as trauma is hope. Control over one's internal thoughts has been proved to be successful in reducing psychological problems, i.e., PTSD and anxiety (Carretta, 2011). One of our hypotheses was conducted to show whether psychological help/professionals do have the power to help victims of date rape, with shifting their perception on pursuing future relationships.

2.5 Awareness

The invisibility of date rape in our society at large is connected to many factors. As long as many of our cultural norms around the world keep accepting aggression within a relationship and the false beliefs about "real rape", the invisibility will continue. Unfortunately, date rape is seldom considered to be a genuine concern and a criminal act, by the perpetrators, victims, and non-bias individuals since sexual activities are a part of a relationship. As

mentioned above, only a small amount, of perpetrators are women. Nevertheless, even the few men, that are sexually abused by their female partner deserve the acknowledgment and help as any other human being. Many prevention programs have been managed in the past and in the present, that teach self-defense strategies, who to be alone with, how to dress, carry self-defense objects or, how not to provoke. It has been proven, that these programs do not eliminate the amount, of rapes occurring and are only adding to the fear and anxiety of society, especially women (Bliss, 2013). Both males and females should be more educated, not only about the famous "club drugs", manipulation and a behavior that the opposite sex may misunderstand, but it should be spoken about more, and this issue should not be further hidden deeply in various cultures. Public perceptions on rape do not progress rapidly and there is still confusion what is considered as rape (Doude, 2008). We want to inspire people to speak up, raise their voice and reach out for help to their friends, family, organizations, or psychologists.

3. Method

3.1 Participants

268 individuals contributed to this study. Subjects chose to participate voluntarily, regardless of gender, nationality, or age. Moreover, the participants did not need to be direct victims of date rape, nor know anybody who is. The informed consent was read by the participants before taking part in this study.

3.2 Materials

A questionnaire was conducted by the researchers in Microsoft Forms, to acquire necessary information in support of, or contradiction to our formed hypotheses. The survey was available in English, Slovak, Russian and

Czech, for a higher probability to obtain more participants. Questions were represented in a specific way, to answer hypotheses 1, 2 and 3, regarding perception of participants on future relationships, professional help, and date rape.

3.3 Procedure

In our study, the questionnaire was given to participants via online platforms, shared on Facebook, Instagram, Mail, and others. Questionnaires were also shared within rape-linked groups, as well as multiple high schools and universities globally. Furthermore, we contacted multiple institutions, i.e., the Rape Crisis Network Europe, for contributing to our study by providing us with participants. The duration of the questionnaire was estimated to 6 minutes. A statistical platform Jamovi, was used for the evaluation of recorded data by the researchers.

4. Results

Total of two hundred and sixty-eight people participated in the research, with 38 nationalities. From all the participants ($N = 268$), 70 were male, 194 were female and 4 chose the option “other” (non-binary and genderfluid). Out of $N = 268$, 199 participants are students, 57 participants are employed and 13 are unemployed. The youngest participant was 15 years old, and the oldest was 65, with the mean/average of 22.6.

An independent-samples t-test was run to see whether the more experience a person has with date rape, the more they change their behavior towards being afraid of forming future relationships.

There was homogeneity of variances as assessed by Levene’s test for equality of variances ($p > .05$), (see Table 1). Participants, that were direct victims of date rape have a changed behavior and are more afraid of forming future relationships ($M = 1.32$), compared to the participants with

no personal experience ($M = 0.857$) (see Table 2). The mean difference is significant (.468), $t(265) = -4.54$, $p < .001$, $d = .666$ (see Table 3).

Considering the participants, that know of a direct victim of date rape, and their attitude towards forming future relationships, further statistics were conducted. There was homogeneity of variances as assessed by Levene’s test for equality of variances ($p > .05$), (see Table 4). The changed behavior and fear of forming future relationships of victims that the participants know of are higher ($M = 1.31$) compared to non-victims ($M = 0.644$) (see Table 5). The mean difference is significant (.665), $t(265) = -8.38$, $p < .001$, $d = 1.03$ (see Table 6).

Therefore, hypothesis 1 was confirmed.

A Chi Square test was run to see if the attitude towards forming future relationships changes within victims with professional help compared to the ones without professional help.

Results show that professional help and forming of future relationship is significantly associated, $\chi^2(2, N = 268) = 17.9$, $p < .001$ (see Table 7). Based on the contingency table, out of 60 victims, 32 did not seek professional help, 9 victims’ perceptions did not change after getting professional help, and 19 victims confirmed, that a professional helped them in changing their perception in forming future relationships (see Table 8). Consequently, a professional helped a higher amount, of victims in their attitude towards forming future relationships.

Therefore, hypothesis 2 was confirmed.

A one-way between-subjects ANOVA was run to see the attitude towards the definition of date rape based on gender and to see whether the mean of males will be

highest in the case that date rape only occurs once a female forces herself upon a male. Three scenarios were in place, to see how males, females and others define date rape from their perspective.

Considering the definition of date rape, when only a man forces himself upon a woman, the estimated mean was highest in females ($M = 0.773$), followed by males ($M = 0.700$), and the lowest in others ($M = 0.250$) (see Table 9).

The scenario, when date rape only occurs once a woman forces herself upon a man, the estimated mean was highest in females ($M = 0.686$), followed by males ($M = 0.557$), and the lowest in others ($M = 0.250$) (see Table 10).

In the last definition, when date rape occurs once an individual forces themselves upon another human being, disregarding gender, the estimated mean was highest in females ($M = 3.29$), followed by males ($M = 3.10$), and the lowest in others ($M = 3.50$) (see Table 11).

Therefore, hypothesis 3 was not confirmed.

Table 1

Levene's Test of Equality of Variances

	F	df	df2	p
Attitude	0.362	1	265	.548

Note. A low p-value suggests a violation of the assumption of equal variances

Table 2

Descriptives of Fear in Victims and People Without Experience

	Group	N	Mean	Median	SD	SE
Attitude	0	207	0.857	1.00	0.699	0.0486
	1	60	1.32	1.00	0.712	0.0919

Table 3

Independent Samples T-Test of Attitude

	Statistic	df	p	Mean difference	SE difference	Cohen's d	Effect Size
Attitude	4.54	265	<.001	-0.468	0.103	0.66	0.66

Table 4

Levene's Test of Equality of Variances

	F	df	df2	p
Attitude	2.47	1	265	.117

Note. A low p-value suggests a violation of the assumption of equal variances

Table 5

Descriptives of Fear in Known Victims and Non-Victims

	Group	N	Mean	Median	SD	SE
Attitude	0	139	0.644	0.500	0.606	0.0514
	1	128	1.31	1.50	0.691	0.0610

Table 6*Independent Samples T-Test of Attitude*

	Statistic	df	p	Mean difference	SE difference	Effect Size
Attitude	Student's t	268	<.001	-0.665	0.0793	-.103

Table 7*Chi Square Test – Victims vs Professional Help*

	Value	df	p
χ^2	17.9	2	<.001
N	268		

Table 8*Contingency Table – Victims vs Professional Help*

	Have you ever been a victim of a date rape?		Total
	0	1	
Did the professional help you, or somebody you know with changing the perception of forming relationships after being date raped?			
Does not apply to me.	167	32	199
No	15	9	24
Yes	26	19	45
Total	208	60	268

Table 9*Descriptives – Gender vs Man Forced Himself Upon a Woman*

	Gender	N	Mean	SD	SE
A date rape only occurs when a man forces himself upon a woman.	Female	194	0.773	1.053	0.0756
	Male	70	0.700	0.953	0.1139
	Other	4	0.250	0.500	0.2500

Table 10*Descriptives – Gender vs a Woman Forces Herself Upon a Man*

	Gender	N	Mean	SD	SE
A date rape may only occur once a woman forces herself upon a man.	Female	194	0.686	0.981	0.0704
	Male	70	0.557	0.828	0.0989
	Other	4	0.250	0.500	0.2500

Table 11

Descriptives – Gender vs an Individual Forces Themselves Upon Another Human

	Gender	N	Mean	SD	SE
A date rape occurs once an individual forces themselves upon another human being, disregarding gender.	Female	194	3.29	1.14	0.0821
	Male	70	3.10	1.21	0.1441
	Other	4	3.50	1.00	0.5000

5. Discussion

This research has examined the definition of date rape and its consequences on people's perception of forming future relationships. The first hypothesis stated that the people that experienced date rape were more inclined to change their perception on forming future relationships compared to the individuals without any personal experience. After the analysis of the data, the hypothesis was confirmed. The second hypothesis stated that the perception of future relationships changed in people who got professional help compared to the victims that did not get any professional help. From the total of 60 victims, 19 participants had a positive result after visiting a professional. Therefore, the second hypothesis was also confirmed. The third hypothesis stated that males will perceive date rape as a criminal act only if a woman forces herself upon a man. After comparing the means in different scenarios, the result was different from the hypothesis. The females had higher means compared to the males. This result needs more research. Therefore hypothesis 3 was not confirmed.

There were some limitations of this study. First, not everybody is ready to confess about the fact, if they were a victim of rape or not, even if the questionnaire was anonymous. Second, this type of study needs more time and a larger sample of participants, so the results are more convincing and trustworthy. The third limitation would be the seriousness of some participants. Not everybody took this study, and especially the questionnaire, as a serious research paper, which consequently created some difficulties with analyzing the data. Moreover, the methodology of the questionnaire, which was conducted by the researchers, had difficulties. From the statistical point of view, data analysis was complicated due to lack of knowledge on conducting a methodologically correct questionnaire. Nevertheless, this type of research could be pursued more into a wider and statistically accurate study, with multiple more hypotheses.

6. Conclusion

The study was conducted to introduce the concept of date rape and profound the knowledge of the impact of this criminal act on the victims forming of future relationships as well as to study the perception of participants based on gender. It has been significantly measured, that the more experience an individual has with date rape, the more his perception and fear changes towards forming future relationships, which supported and therefore confirmed our hypothesis. Furthermore, the hypothesis addressing the effect of professional help on the victims perception of forming future relationships was also confirmed. In the last hypothesis, the results were rejected, nevertheless, the statistical results were interesting, and possibly a stepping stone for further, more profound research. Due to the outcome of this study, we hope that more and more people globally will start paying more attention to this criminal act, as well as to the victims physical and mental well-

being. To the victims, regardless of gender, we hope that this study gives them the courage to speak up.

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Resilience, Hope, and Happiness as Predictors of Flow at Work in Teachers of Foreign Languages

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Abstract

Flow is regarded as a state of consciousness which leads individuals to becoming utterly immersed in a specific activity, enjoying it intensely. Absorption, enjoyment, and elemental motivation are the core elements that characterize flow as a peak experience at work. Previous research regarding the constructs of resilience, subjective happiness and hope has revealed that they all tap into an individual's ability to experience positive, fulfilling work-related flow. Three hundred and three foreign language teachers working in Language Schools, aged between twenty-five and fifty-five years old, having at least a year of work experience, took part in the study, designed to ascertain if resilience, subjective happiness and hope predict flow at work. Participants filled in the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003), the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) and the Hope Scale (Snyder et al, 1991), as well as the Work-related Flow Scale (WOLF; Bakker, 2001), regarding predictors and criterion respectively. The outcomes of the linear multiple regression brought into light that overall, resilience, subjective happiness and hope contributed significantly to the model effect, predicting heightened experience of work-related flow. Although the correlational design places limits to the causal implications of the current study, the findings can open venues to positive psychology teacher-based interventions with a view to enhancing teachers' positive mental attitude and consequently, students' wellbeing.

Keywords: resilience, hope, happiness, flow at work, teachers

1. Positive Psychology

During the last decades, there has been an acute interest in Positive Psychology as it focuses on an individual's unique positive characteristics and maximizes their potential (Lomas & Ivtzan, 2016). Positive Psychology's study of positive emotions, traits and institutions pays

particular attention to human flourishing (Rao & Donaldson, 2015). It is a field which is concerned with both well-being and optimal functioning, promising improvement in terms of the quality of life by preventing the pathologies arising when life is considered to be barren (Wong, 2017). Specifically, Positive Psychology presumes

that life encompasses more than trying to avoid or undo problems and hassles, demanding as much focus on strengths as on weaknesses and as much attention to the fulfilment of the lives of healthy individuals as to the healing of the wounds of distressed people (Ciarrochi, Atkins, Hayes, Sahdra & Parker, 2016).

Although many areas of practice in school psychology focus on identifying the etiologies of stress and burn-out experienced by teaching staff, Positive Psychology can help identify strengths in teachers based on empirical research, on assets rather than deficits, and without requiring wholesale commitment to costly curriculum (Shoshani & Steinmetz, 2015). Recent research has demonstrated that Positive psychology encourages teachers to foster productivity and collegiality, as well as support for hard work and high expectations for student achievement (Noble & McGrath, 2015). In addition, many studies of Positive Psychology indicated that protective factors such as resilience and positive emotions may protect teachers against adversity and enhance their well-being (White, 2016).

Even though a plethora of studies and reviews has focused on teachers' stress, burn-out and frustration as well as their negative effects on both teachers' and students' performance (Brunsting, Sreckovic & Lane, 2014), there have been few studies investigating the effects of positive emotions and protective factors, such as the below-mentioned resilience, hope and happiness together, as part of the field Positive Psychology (White, 2016).

1.1 Resilience

Resilience is defined as the capacity of an individual to make use of mental processes and behaviors in an effort to promote personal benefits, protect themselves from potentially negative effects of any stressor, adapt positively and remain calm during crises (Olsson, Jerneck, Thoren, Persson & O'Byrne, 2015). Moreover, a variety of studies pointed out that resilience determinants encompass a host of psychological and social factors interacting with each

other to ascertain the way an individual responds to stressful experiences in all life sectors, including work (Robertson, Cooper, Sarkar & Curran, 2015).

Similarly, research has revealed that resilience is regarded as a multidimensional characteristic, associated with numerous desired outcomes regarding emotional health, as it assists individuals cope with stress and perform well at work in the face of adversity (Vanhove, Herian, Perez, Harms & Lestler, 2016). Specifically, resilience focused interventions are effective not only in reducing depressive symptoms and general psychological distress of teachers, but also in increasing life satisfaction, which makes teachers more likely to remain in their profession (Martinez-Marti & Ruch, 2017). Furthermore, recent research has demonstrated not only the significance of resilience in adults both in daily life and at the workplace, but also the fact that it plays an integral role in sustaining teachers in their profession (Stride & Cutcher, 2015).

1.2 Hope

Hope is a construct whose history dates back to ancient Greek Philosophers, defined as positive expectations in connection with the fundamental perception that an individual's desired goals could be achieved (Seligman & Csikszentmihalyi, 2014). Remarkably, Snyder's theory of hope (1991) places emphasis on goal-directed cognitive process, where an individual utilizes both pathways, referring to one's perceived capacity to develop specific routes and strategies to achieve desired goals, and agencies, which are ways of initiating and sustaining motivation for putting those strategies into practice. Therefore, Positive Psychologists have found that elevated levels of hope resonate heightened belief in an individual's abilities to attain as well as sustain concentration and determination towards achieving goals (Hutz, Midgett, Pacico, Bastianello & Zanon, 2014).

Similarly, an extensive systematic review of articles came to the conclusion that individuals with elevated levels of hope maintain positive feelings in the present, create

positive expectations and work in an active manner with a view to achieving the perceived successful outcomes in personal and professional life (Donaldson, Dollwet & Rao, 2015). In addition, hope, as a human strength, has been related to one's life fulfilment as a way to adapt to everyday life challenges, leading to successful goal pursuit in the work environment (Malinowski & Lim, 2015). Recent research has highlighted that hope is associated with elevated well-being and zest for teaching (Sezgin & Erdogan, 2015).

1.3 Subjective Happiness

Subjective Happiness, defined as a combination of frequent instances of positive effect, rare occasions of negative effect and a heightened level of life satisfaction, is considered to be a variable that has attracted rising interest due to the growth of Positive Psychology (Sarıçam, 2015). Given that subjective happiness is a psychological state of joy, contentment and wellbeing, was found to lead happy people to achievement across multiple life domains (Renshaw, Long & Cook, 2015). Multiple studies suggest that subjective happiness is positively related to self-perceptions of wellbeing and perceived quality of life (Quezada, Landero & González, 2016), physical health, positive emotions and self-esteem (Nam & Lee, 2014), social participation and satisfying relationships (Satici, Uysal & Deniz, 2016). On the contrary, subjective happiness has been deemed to be negatively related to the presence of perceived stress (Ruiz-Aranda, Extremera & Pineda_Galan, 2014) and depressive symptoms (Pompili et al., 2016).

Furthermore, it has been indicated that subjective happiness is a variable that contributes to a high level of professional success, work engagement and occupational well-being (Eckleberry-Hunt, Kirkpatrick, Taku, Hunt & Vasappa, 2016). Specifically, studies regarding health professionals and teachers have demonstrated that subjective happiness is positively related to career goals and purpose, personal achievement and perception of

manageability in terms of workload (Mahipalan & Sheena, 2019). Additionally, teachers with higher subjective happiness levels tend to have more positive thoughts about themselves and increased self-esteem, which influence the state of subjective wellbeing at work (Renshaw, Long & Cook, 2015).

1.4 Flow at Work

As far as Positive Psychology is concerned, flow is a mental state in which a person performing a kind of activity is fully immersed in a sense of energized focus, enjoyment, as well as total involvement in the process of the task (Nakamura & Csikszentmihalyi, 2014). In essence, flow is characterized by intense concentration on the present moment, a sense of personal control over the activity in conjunction with an autotelic experience, which is intrinsically rewarding (Schmidt, Shernoff & Csikszentmihalyi, 2014). What is rather counterintuitive is the outcome of some studies, indicating that flow is experienced more frequently when people are immersed in work or other challenging tasks, rather than during free time activities (Engeser & Baumann, 2016).

Previous literature has demonstrated that, while in flow, full-time employees experience increased level of focus and goal achievement as well as elevated level of energy and enjoyment that result in declarative well-being outcomes (Ilies et al., 2017). Similarly, studies have revealed that flow, as a state of total concentration, in conjunction with happiness leads employees to making positive judgements regarding the quality of their professional life, while experiencing inherent satisfaction and continuous interest in their work (Csikszentmihalyi, 2020). Moreover, employees who feel intrinsically motivated by the underlying aspects of their duties at work are fascinated by the work-related activities they perform (Zito, Cortese & Colombo, 2016).

In the same vein, much research has brought to light that teachers who experience flow at work, which is characterized by concentration, work enjoyment and

intrinsic motivation at work, mobilize more personal and organizational resources (Habe & Tement, 2016). Additionally, with regard to education, McIntyre (2016) supported that students and teachers with more experience with languages have a tendency to experience more flow when being completely engrossed with a linguistic task at hand. On top of that, recent studies in schoolteachers demonstrated that happiness and life satisfaction are related, owing to more frequent flow experience at work (Olcár, Rijavee & Golub, 2019).

1.5 Aim and Hypothesis

Given the aforementioned literature, the purpose of the current study is to examine whether flow experience at teachers' work can be predicted on account of resilience, hope and happiness combined due to the fact that there is no sufficient amount of research with regard to resilience, hope and subjective happiness as predictors of work-related flow in foreign language teachers. This field of work is interesting and worth studying, as it focuses on a population that works a lot with other people, especially students.

Specifically, in Greece foreign languages are taught at private foreign language institutions, outside school, in the case of both minors and adult learners. According to the Panhellenic Association of Language School Owners (Europalso, 2019), about 20.000 foreign language teachers work in the 2.800 private Language Schools in Greece. Therefore, it seems necessary to shed some light into these relationships, with the actual intention of being able to develop positive characteristics and resources for Greek foreign language teachers in an effort to avoid negative emotions and experience more positive ones, such as flow at work, which may lead to their personal and professional flourishing.

Consequently, the research question guiding this thesis was "What is the role of resilience, subjective happiness and hope in foreign language teachers' flow at work?" As far as the research hypothesis is concerned, the following

statements will test the relationship between the variables. Firstly, it is hypothesized that there will be a significant correlation between resilience, hope, subjective happiness and work-related flow regarding foreign language teachers. The second hypothesis is that resilience, hope and subjective happiness will significantly predict foreign language teachers' flow at work.

2. Method

2.1 Design

A quantitative, correlational, non-experimental design was applied. Both the criterion and the three predictors were continuous variables. Particularly, the criterion was work-related flow, and the three predictors were resilience, hope and subjective happiness. In essence, subjective happiness was measured in a scale of unitary structure, whereas the hope scale consisted of two dimensions, agency and pathways. Moreover, resilience was measured as a function of three factors, tenacity, adaptability-tolerance and intuition, and finally, work-related flow consisted of three dimensions, namely absorption, work enjoyment, and intrinsic work motivation. All the above scales were used as unidimensional structures in the present study and therefore, the total scale scores of all the different constructs were computed.

2.2 Participants

Three hundred and three foreign language teachers of both genders were recruited to take part in the online study, according to the two inclusion criteria of being 25 to 55 years of age and having at least a year of work experience. The sample consisted of Foreign Language Teachers working in Language Schools all over Greece. The link of the survey was sent to the Panhellenic Association of Language School Owners and they, in turn, sent it to foreign language teachers all over Greece through email. This was a snowball sample with voluntary participation. Three hundred and three participants filled in the whole task. Specifically, females (257 participants, 84.8 %) far

outnumbered males (46 participants, 15.2 %), while ages ranged from 25 to 55 ($M = 41.41$, $SD = 8.62$). Additionally, the majority of foreign language teachers working in Language Schools teaches English (208 participants, 68.6%) compared to those who teach other foreign languages, such as French, German, Italian or Spanish (37 participants, 12.2%), while the rest of the participants teach both English and one of the aforementioned foreign languages (58 participants, 19.1%).

2.3 Materials

A demographic questionnaire was answered by Foreign Language Teachers regarding participants' age, gender, nationality, years of work experience and foreign language taught.

Resilience, was measured using Connor-Davidson Resilience Scale (CD-RISC), developed by Connor and Davidson (2003), on account of its high concurrent validity and internal consistency. It consists of 25 questions, rated on a five-point Likert scale, from 0 (Not True at all) to 4 (True nearly all the time), which assess the degree and frequency of the respondents' sense of their ability to recover quickly from difficulties. Specifically, this scale is measured as a function of three factors, namely tenacity, adaptability-tolerance and intuition. "Past success gives confidence for new challenge" (tenacity), "I can deal with whatever comes" (adaptability-tolerance) and "Know where to turn for help" (intuition) were some of the positively framed items, representing perceived resilience. The scale above was used as a unidimensional structure. Overall, higher scores highlighted increased levels of resilience in one's life. The internal reliability analysis was almost excellent, as it showed Cronbach's alpha values (.91) consistent with other studies (Gonzalez, Moore, Newton & Galli, 2016).

The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) was implemented so as to measure the second predictor, happiness, on account of the fact that it is well validated with other scales, with regard to convergent

and discriminant validity, and it has revealed high internal and test-retest reliability (Renshaw, Long & Cook, 2015). It contains 4 items, assessing a person's global subjective happiness level and is answered on a seven-point scale by means of personal statements, via which respondents either self-rate themselves ("In general, I consider myself: from 1 = not a very happy person to 7 = a very happy person") or compare themselves to others ("Compared to most of my peers, I consider myself: from 1 = less happy to 7 = more happy"). Overall, the scale indicates that the more elevated the score, the higher participants self-rate themselves. A single composite score is calculated by computing the average of the responses to the four statements, ensuing reverse coding of the fourth. The scales internal consistency was .72, which was satisfactory, and in agreement with previous literature, where the Hope Scale demonstrated a Cronbach's alpha ranging from .72 to .89 (Yue, Leung & Hiranandani, 2016).

The Hope Scale (Snyder et al., 1991) was used to measure the third predictor, wishful thinking which leads to positive expectations about one's future, on account of its high interval consistency as well as convergent, construct and discriminant validity, and high test-retest and internal reliability (Seligman & Csikszentmihalyi, 2014). It is a 12-item questionnaire, containing eight hope items and four fillers tapping the feeling of successful determination in relation to a person's goals in general. Specifically, one item reflects the past ("I've been pretty successful in life"), two items reflect the present ("I energetically pursue my goals" and "I meet the goals that I set for myself"), and one item reflects the future ("My past experiences have prepared me well for my future"). "There are lots of ways around a problem" was an example of pertaining to individuals' cognitive appraisals in terms of their capacity to generate means for surpassing goal-related barriers and reaching goals. All items scaled from 4 = Definitely True to 0 = Definitely False, indicate that the more heightened the score, the higher an individual's likelihood of having hope. In this study the Hope Scale demonstrated a high

Cronbach's alpha coefficient ($\alpha = .82$), consistent with previous research (Gomez, McLaren, Sharp, Smith, Hearn & Turner, 2015).

Finally, flow at work, as the criterion, was measured using the Work-related Flow Scale (WOLF; Bakker, 2001). Previous research has highlighted high internal reliability in conjunction with good discriminant and convergent validity of the scale (Olcár, Rijavee & Golub, 2019). It consists of thirteen questions assessing three flow dimensions, namely absorption (4 items), work enjoyment (4 items), and intrinsic work motivation (5 items). "When I am working, I think about nothing else" (absorption), "I feel cheerful when I am working" (work enjoyment), and "I get my motivation from the work itself, and not from the reward for it" (intrinsic work motivation) were some examples of the statements the respondents rated. The participants were asked to assess the frequency, ranging from 1 (Never) to 7 (Always), in which they had each of the experiences during the preceding two weeks. A total value was obtained by summing across the answers for all the items. The higher a person scored, the higher level of satisfaction and motivation is experienced at work. In our sample, the internal reliability analysis was satisfactory, as it showed Cronbach's alpha values (.90) consistent with previous research (Zubair, 2015).

2.4 Procedure

Prior to inviting participants, the present study was granted ethical approval by the Department of Psychology, Social Work and Counselling of Greenwich University, as well as permission to come into contact with foreign language teachers all over Greece by the Panhellenic Association of Language School Owners (Appendix I). Participants were invited to voluntarily participate in the study by means of email, with a view to being informed about the identity of the researcher, as well as the purpose of the study, without being given any further details that could affect their impartiality. After being introduced to the

topic of the study, respondents were provided with a Qualtrics online link.

First, they were acknowledged of the purpose of the study and the investigated variables via online consent form in an effort to be made fully aware of their withdrawal rights. In addition, they were informed that confidentiality and anonymity would be ensured, as well as the fact that the required time for the completion of the questionnaires would be approximately fifteen minutes. On account of the fact that this study involved work-related flow, participants were advised to only take part if they had at least a year of work experience. Following this, participants came to the point of signing the consent form using the initials of their name.

After completing the demographic questions, stating their age, gender, years of work experience and foreign language taught, respondents filled in four questionnaires regarding resilience, hope, subjective happiness and flow at work.

Upon completion of the aforementioned sections, a debriefing form was presented to respondents, providing them with information about the rationale of the study, which was based on previous research. Although the questionnaires were not likely to raise emotional discomfort, participants were provided with counselling services and support groups, such as Klimaka, available in case any aforementioned feelings emerged. Finally, all participants completed a unique personal code, prior to being thanked for their invaluable contribution to the study.

2.5 Statistical Analysis

The data collected was processed and analyzed using IBM's Statistical Package for the Social Sciences (SPSS) version 20 software. First of all, bivariate correlations, tests of normality and descriptive statistics were conducted. Finally, a linear multiple regression analysis was applied in order to calculate the extent to which the combination of the predictive variables can predict variability and variance of the dependent variable.

3. Results

Given the three predictors subjected to the test, the sample size of 303 was considered to be adequate (Tabachnick & Fidell, 2007). The ratio for this analysis was 303 valid cases to 3 predictors, which boils down to 101 to 1, satisfying the minimum requirement of 15 to 1 (Tabachnick & Fidell, 2001). Following the import of data of the aforementioned participants into the SPSS, descriptive statistics were carried out in order to depict the mean and standard deviation of each variable, as summarized on Table 1.

Table 1

Means and Standard Deviations on the Measure of Resilience, Subjective Happiness and Hope as Predictors of Foreign Language Teachers at work

	N	Min	Max	M	SD
Resilience	303	57	123	96.86	12.58
Subjective Happiness	303	7	28	18.75	2.85
Hope	303	14	32	25.53	3.15
Work-Related Flow	303	15	91	67.66	12.09

In Table 1, it can be observed that participants' scores on Resilience ($M = 96.86$, $SD = 12.58$) indicate a value of average resilience of the respondents. The second variable of Subjective Happiness ($M = 18.75$, $SD = 2.85$) portrays a moderate score with a tendency towards a moderate level of happiness. The scores of the third variable, Hope ranged from 14 to 32 ($M = 25.53$, $SD = 3.15$) indicate that the sample achieved moderate scores with a tendency towards high scores regarding hope. Finally, the scores of the criterion of Work-related Flow ranged from 15 to 91 ($M = 67.66$, $SD = 12.09$), depicting moderately high levels of flow in participants. Overall, descriptive statistics showed

that foreign language teachers seemed to have a marginally elevated preference for Hope.

Histograms were carried out in order to check data for outliers in each cell as well as screen the curvilinear line for normal distribution of the scores. While inspecting data, no univariate outlier was spotted, whereas the visual screen of the histograms concerning normal curve display indicated that residuals distribution was not normal. Therefore, the Kolmogorov-Smirnov test was conducted in order to examine normal distribution, reflecting that Resilience, $D(303) = .064$, $p = .004$, Subjective Happiness, $D(303) = .102$, $p < .001$, Hope, $D(303) = .112$, $p < .001$, and Work-related Flow, $D(303) = .056$, $p = .023$, were all significantly non-normal. Since the tests of normality revealed skewed distribution, a non-parametric measure of rank correlation, Spearman's coefficient was implemented, as outlined on Table 2.

Table 2

Correlations Between Predictors and Work-Related Flow

Measure	1	2	3	4
1. Resilience	–			
2. Subjective Happiness	.43**	–		
3. Hope	.71**	.35**	–	
4. Work-Related Flow	.43**	.41**	.44**	–

**correlation is significant at $p < .01$

As displayed in Table 2, Spearman Correlations were computed among the three predictive variables. Seeing that no correlation reached the .80 threshold, the analysis reveals that no two variables were closely related (Keith, 2014). Specifically, the Spearman's coefficient revealed a positive moderate relationship of statistical significance between resilience and subjective happiness, $r_s = .43$, $p <$

.001, two-tailed. Resilience is also positively strongly and significantly related to hope, $r_s = .71, p < .001$, two-tailed, whereas resilience and work-related flow are positively, moderately and significantly correlated $r_s = .43, p < .001$, two-tailed. Additionally, there is a positive weak and significant correlation between subjective happiness and hope, $r_s = .35, p < .001$, two-tailed, as opposed to the positive moderate and significant correlation between subjective happiness and work-related flow, $r_s = .41, p < .001$, two-tailed. Finally, hope and work-related flow are positively weakly and significantly related, $r_s = .44, p < .001$, two-tailed. Overall, as can be interpreted from the aforementioned correlations, hope marginally has the strongest correlation with work-related flow, implying that an individual will experience more flow at work if the individual is increasingly happy.

The assumptions of linear multiple regression were investigated before conducting the analysis. A scatter plot was applied in order to assess linear relationships and violation of homoscedasticity, demonstrating that the assumptions with regard to linearity and homoscedasticity were satisfied (Cohen, Cohen, West & Aiken, 2013). In terms of the multicollinearity assumption, it was conceived to have been met, since an examination of collinearity diagnostics revealed that tolerances were higher than the threshold of .20 (Keith, 2014). Despite the positively skewed normality tests, the regression was considered to be robust against the violations of normal distributions, since the sample size was big enough (Allen, Bennett & Heritage, 2018). Therefore, a linear multiple regression was carried out with resilience, subjective happiness and hope entered as predictors, and work-related flow as the criterion, the results of which are summed up on Table 3.

Table 3

Regression Analysis Summary for Resilience, Subjective Happiness and Hope Predicting Work-Related Flow

Variable	B	Std. Error	β	t	p
(Constant)	9.79	5.44		1.80	0.073
Resilience	0.16	0.07	0.17	2.22	0.027
Subjective Happiness	1.21	0.23	0.29	5.24	0.001
Hope	0.78	0.27	0.20	2.84	0.005

Table 3 highlights the results of the predictive variables in the linear multiple regression analysis. The R square in the data analysis is 0.531, which means that a significant portion of 53.1% of the variance in work-related flow is explained by the linear combination of the predictors, $R^2 = 0.531, F(3,299) = 39.10, p = 0.001$. According to Pallant (2013), a value around the 0.45 for the R square is a respectable result. Specifically, Resilience was entered and contributed significantly to the overall model effect, as every one unit increase in resilience was associated with a significant increase of 0.16 in work-related flow after controlling for other variables, $B = 0.16, t(299) = 2.22, p = 0.027$. Introducing the second predictor, after controlling for other variables, an average increase of 1.21 work-related flow was observed for every one unit increase in subjective happiness, providing a significant contribution, $B = 1.21, t(299) = 5.23, p = 0.001$. Additionally, after controlling for other variables, hope showed a significant contribution to the overall model, as every unit increase in hope was associated with a significant increase of 0.78 in flow at work, $B = 0.78, t(299) = 2.84, p = 0.005$. Remarkably, although all predictive variables were significant, subjective happiness was found to be the most important predictor accounting for the strongest, unique contribution to explaining the work-related flow.

4. Discussion

The present study's aim was to investigate whether resilience, subjective happiness and hope predict foreign language teachers' experience of flow at work. The current findings indicated that the combination of the predictors of resilience, hope and happiness significantly contribute to work-related flow while teaching. Specifically, increased levels of the aforementioned predictive factors were associated with significant elevated levels of foreign language teachers' flow experience at work, while subjective happiness was observed to be the most important predictor.

The first research hypothesis that there would be a significant correlation between resilience, subjective happiness, hope and foreign language teachers' flow while working, was supported by findings of the study, which was in accordance with the research of Martínez-Martí and Ruch (2017) regarding teachers' resilience and happiness at work. Equally, high levels of hope were significantly connected to an increased level of flow experienced by teachers, which was in agreement with previous literature (Sezgin & Erdogan, 2015). Similarly, elevated levels of subjective happiness in conjunction with hope were significantly related to work-related state of teachers' flow, which followed suit with Eren's research (2014). Contrary to my expectations, there was a moderate relationship between resilience and flow at work, whereas hope was found to have the strongest correlation with work-related

teachers' flow, which contradicts with Gu's research (2014).

Concerning the second hypothesis that resilience, hope and happiness will significantly predict foreign language teachers' flow at work, it was highlighted by the findings of the present study. Remarkably, foreign language teachers' resilience was not only found to be above average, which was consistent with recent research projects (Ngui & Lay, 2017; Brouskeli, Kaltsi & Loumakou, 2018), but also increased resilience was associated with a significant increase in work-related flow, as previously reported by Zubair (2015). Furthermore, although higher hope scores significantly contributed to flow experienced at work, subjective happiness was found to be the most important predictor, which is consistent with the research of Lan, Wong, Jiang and Mao (2017).

All in all, the current study's findings indicated that in spite of the hardships and adversities foreign language teachers encounter in Greece, which is one of the most wounded countries due to the global financial crisis (Brouskeli, Kaltsi & Loumakou, 2018), protective factors such as resilience, hope and happiness enhance teachers' flow experienced at work.

4.1 Limitations

Without doubt, there were limitations to this study, which should be considered. In fact, self-report questionnaires can be confining in terms of accurate, honest and bias-free reporting. Particularly, social desirability and presentation bias could have affected the

results (Crowne & Marlowe, 1960). Nevertheless, the anonymous nature of the study in conjunction with the sense of comfort of the respondents answering the mail-in questionnaires, may have encouraged honest responses.

Moreover, although snowball sampling procedure was used as a cost-effective chain referral process with a view to expand geographical scope and allow access to foreign language teachers' populations all over Greece, which were difficult to sample, it could lead to biased sample (Valerio et al., 2016). Therefore, random sampling would be more appropriate in an effort to ensure that every case in the target population has an equal chance to participate. However, in the present study sampling bias is unlikely to have occurred since the Panhellenic Association of Language School Owners sent the email to teachers all over Greece, meaning that there is little likelihood of some members having lower or higher sampling probability than others.

Furthermore, the linear multiple regression analysis as a procedure in which the value of the criterion variable is estimated using its correlation with the predictor variables may have limited the way of determining each variable's unique predictive power and contribution to the criterion, which could be more obvious by conducting a hierarchical multiple regression analysis (Cohen, Cohen, West & Aiken, 2013). Similarly, the quantitative nature of the research was limiting in terms of the in-depth and exploratory analysis of positive emotions, such as hope, and happiness experienced by teachers at work.

Consequently, a combination of quantitative and qualitative research would be far more experiential, explaining the context that numbers are unable to reveal (Silverman, 2016). Finally, as correlational statistics were applied, no definite statements can be made in terms of causality.

Notwithstanding these limitations, the study had several strengths including the fact that, compared to previous research, the sample was not restricted to college students or novice teachers. Given that most past research was mainly conducted in Asia, America and Australia, regarding elementary school teachers, the current study's advantage was that it was held in Greece, which has a high number of foreign language teachers working in private Language Schools (Tzagari & Vogt, 2017). Moreover, although there was much research in terms of teacher's resilience and well-being, there is no Greek research about the effects of resilience, subjective happiness and hope combined on foreign language teachers' flow at work. In fact, it is the first study focusing on concepts of Positive Psychology with regard to Greek foreign language teachers.

4.2 Future Studies

For future studies, an experimental design of research measuring real-time flow and mapping the precise prevalence of peak experience, rather than use questionnaires of self-report to measure flow retrospectively, could further examine the impact of the experienced flow at working conditions. In a similar vein,

several other factors should be taken into consideration in future research as potential predictors of work-related flow, including teachers' personal resources, such as their self-esteem, self-efficacy and optimism. Moreover, it is essential that future research integrate more levels of mediating variables, such as the impact of the language taught, gender differences and personality traits, when considering teacher-based interventions.

Additionally, a longitudinal study could not only examine the relationship between resilience, subjective happiness, hope and work-related flow, but it would also be an effective way of clarifying whether the reported associations vary across time, as well as measuring whether flow correlates with long-term experiences at work, such as work engagement.

4.3 Implications

Overall, this study provided interesting avenues for school-based interventions both in private Language Schools and State Schools. Specifically, the aforementioned findings can contribute to positive psychology teacher-based interventions with a view to promoting teachers' motivation, cultivating positive subjective experiences, building positive individual traits and combating high levels of stress and burn-out at work. As a result, teachers can flourish through enhanced optimal human functioning and boost of their performance. Such interventions may not only provide teachers with the opportunity to boost their flow at work, but in doing so their positive mental state and behaviors might have an

impact on students and consequently, contribute to the school community.

The present findings provide support for resilience, hope and happiness as predictors of foreign language teachers' flow at work. Thus, this study is a step in moving towards a better understanding of the psychological states that benefit not only foreign language teachers, but students and the whole school community.

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Do Emotions Have a Language? A Pilot Study

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Abstract

The choice of this topic comes from our curiosity about all those things that are said about bilingual people and about the benefits they can have at a cognitive level, so we decided to investigate the topic in depth. We are going to focus on emotions as we believe it is a little explored topic and we found it interesting to know more about this area. For this purpose, we have carried out a study to a sample of 30 students through the technique of self-report, and we analyzed the results that will be presented in this paper in order to accept or not the hypothesis raised.

Keywords: bilingualism, languages, emotions, depression

1. Introduction

To begin with the first point of the paper, it is important to detail the general objective of the study, which in this case corresponds to studying the relationship between bilingualism (independent variable) and the expression of emotions (dependent variable). However, before continuing to talk about this objective, it is important to comment briefly on the theoretical framework on which all the research will be based. It could be said that the concept of bilingualism, despite having varied definitions, refers more often to the "habitual" use of two languages by an individual in a community of speakers, one of the languages considered as the mother tongue and another that is learned later. However, when it comes to analysing this term by also considering the way in which emotions are expressed, the analysis of the concept becomes even more complex.

The specific objective of this work is to show whether the mother tongue of the sample chosen for the study is the preferred language for expressing emotions, in particular those related to depression. Therefore, the hypothesis raised would be that, in a test measuring levels of depression, participants will show higher levels in the construct when the questionnaire is written in their first language than in their second language.

The various sources that have contributed to the selection of the above-mentioned topic will then be examined.

2. Literature Review

This section reviews the studies that have been conducted in regards to our topic of bilingualism and emotions and to identify a link between them.

The idea of a link between them is one to be explored because of the extensive psycholinguistic studies suggesting that the difference in emotional impact between two languages is significant to the bilingual individual, where first language learned bears personal attachment while the second language learned, especially after puberty, is emotionally distant (Pavlenko, 2002). Furthermore, numerous cross-cultural studies have also shown evidence to support the aforementioned idea and reaffirms that people speaking different languages perceive emotions differently (Lindquist et al., 2015).

Another reason to question this association is due to the sociological implications it may have. Reduced emotionality more often leads to a more reasoned and controlled response resulting in a utilitarian choice as oppose to the choice that is more emotionally driven if a dilemma is presented in native language (Costa et al., 2014).

In regards to multilingualism, a debatable topic is the difference in the brain functionality between monolingual and bilingual individuals and whether one has an advantage over other (Nichols et al., 2020). While Nichols et al. (2020) found no significant advantage between the two, another study claims that bilinguals tend to have better regulation and executive functional skills as compared to monolinguals (Zirnstein et al., 2019, Bakić & Škifić, 2017). Similarly, Kovelman et al. (2008) contradicts Nichols et al. (2020) and suggests that there are two differentiated linguistics systems in bilinguals; hence, presence of differentiated neural representation of two languages which provides basis for a possibility of functional separation between two languages too. When it comes to cognitive processing, use of foreign or less familiar language compared to first languages, adds on to the cognitive load and anxiety of the individual and can result in the reduction of controlled process which ultimately affects the choices made by the individuals in certain circumstances (Costa et al., 2014).

These studies suggest that in some shape or form the level of emotionality is affected by the acquisition of more than one language, hence, the idea of following research was established.

3. Methods

In this section we will talk about the method we follow for this research on emotions and bilingualism, starting with the participants we are going to have, continuing with the materials we will use and ending with the procedure we are following.

3.1 Participants

The test will be carried out online and the participants will be at least 29 university students between 18 and 22 years old who have Spanish as their first language and English as their second language or at least an acceptable level of that language. To check this, we will ask participants to inform us of their level of English in the test itself before starting with the questions.

We will try to make it 50% women and 50% men to avoid gender bias. A large part of the sample will be aged 20, but we will try to match ages as far as possible, although we have considered that the level of English will be the most appropriate, not the age, so we do not think that the results will be affected by that variable.

3.2 Materials

For this study we will use one of the most widely used questionnaires to measure depression in the population, the well-known Beck Depression Inventory test or BDI-2. This questionnaire consists of 21 questions in which the person must mark on a scale of 0 to 3 how he/she has felt in the last two weeks (0= minimum/ 3= maximum). There is no inverted element that we have to take into account when calculating the results.

We have chosen this questionnaire already validated and adapted to both English and Spanish, so we consider it more practical to use this questionnaire than to create our own scale without having the opportunity to do the necessary studies to test its validity and reliability.

3.3 Procedure

We will start our investigation by passing the questionnaire via the Google form to the selected participants online for them to fill in (as this is a quick and easy way to carry out the test). We will keep the questionnaire open for a week so that they can continue to do so, although we estimate that the time for the test as such will be fifteen minutes. The results will be transferred to an Excel sheet for later analysis with the JAMOVI programme.

We will then go on to analyse the data obtained and explain what they mean.

4. Results

In this study of 29 participants, the mean of the depression score for the test taken in Spanish was 11.1, which was slightly higher than the median (10); whereas, the mean for the test in English was 12.7 which was also higher than the median (12) (see Table 1).

A within-subjects t-test was then conducted to determine whether the difference between the means of the depression score when conducted in Spanish and English was statistically significant or not.

The participants had higher depression score when they attempted the test in English ($M = 12.7$) as opposed to the lower depression score when they attempted the test in Spanish ($M = 11.1$). The mean difference was 1.59 which was significant as $t(28) = -3.08, p = 0.005$ (see Table 2).

However, our initial hypothesis was that those of the test in Spanish would be higher than those of the other, and as can be seen in Table 1 of descriptive statistics, the average of the test in Spanish (11.1) is lower than that of the test in English (12.7); therefore, the hypothesis was rejected.

The various reasons why this might be the case will be discussed below under the Discussion section.

Table 1

Descriptive Statistics for Depression Scores in Spanish and English

	N	Mean	Median	SD	SE
Spanish	29	11.1	10	8.03	1.49
English	29	12.7	12	7.76	1.44

Table 2

Within-Subjects T-Test for Means of Depression Score in Spanish and English Tests

		Statistic	df	p	Mean Difference	SE Difference	
Spanish	English	Student's t	-3.08	28.0	0.0005	-1.59	0.515

5. Discussion

During this section we will proceed, in the first place, to relate the results exposed above with some of the findings found in the studies that have been carried out about the relationship between bilingualism and the expression of emotions, and that were exposed in the section of literary review. For example, Pavlenko (2002) states that there is a difference in emotional impact between two languages in a bilingual person, with the first language having the greatest personal attachment while the second language learned after puberty is more emotionally distant. This idea has also been supported by numerous cross-cultural studies and it is because of this consensus that our hypothesis was decided to be based on it. Specifically, it was expected that after administering the same test (of depression) to a bilingual person in two different languages, the results in the mother tongue (in this case Spanish) would be higher than in the second language (English). However, after evaluating the results reported by the participants themselves our hypothesis was not confirmed.

As stated in the previous section, this may be due to various reasons, one of which could be that although the Beck Depression Inventory (BDI-2) has shown immense

potential for the detection of depression across languages and cultures; however, its validity and structure remains poorly studied across these cultures and languages. Specifically, the Spanish version has accounted for most of the interpretative differences when translated from English to Spanish (Nuevo et al., 2009); therefore, this could explain the significant difference between the mean depression score between the two languages.

In addition, it is also important to realize the limitations of the study. The sample size was small enough that definitive inferences could be made, and the questionnaires were distributed online via Google forms to participants who chose to remain anonymous, and since the questionnaires were completed by participants without any monitoring, it is impossible to rule out the possibility that participants might not be completely honest or use some type of translation application, as well as that they might respond randomly.

On the other hand, the questionnaires were administered over a short period of time, so the results may also have been influenced by the recall of the answers and the order of the questions, among other reasons.

6. Conclusion

In conclusion, it can be said that ultimately the language used by an individual who has a command of more than one language plays an important role in the expression of his or her emotions. In fact, this assertion is also shown in our study, even though it did so, contrary to what was expected, since significant differences were still obtained between the scores of depression in Spanish and in English. The reasons for which it is believed that the hypothesis put forward for the research has not been confirmed are, in summary, reasons internal to the questionnaire itself, as well as others outside of it and which depend more on the characteristics of the research itself and the effects on the sample.

Nevertheless, it is important to make it clear that the study continues to conform to the notion that the level of expression of emotionality is affected by the acquisition of another language, which is the general idea we have held to from the beginning.

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The Influence of Social Media on Self-Esteem: A Pilot Study

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Abstract

It is well-known that the use of technology and social media have greatly impacted people's lives. The aim of this study was to examine whether social media has a negative influence on self-esteem. 26 female and male university students in Czech Republic between the ages of 18-25 participated in an online survey, which included the Rosenberg's Self Esteem scale and the Social Networking Time Use Scale (SONTUS). The data was examined by means of a correlation analysis. The results showed a significant inverse relationship between social media and self-esteem. The initial hypothesis that social media negatively affects self-esteem was accepted. In conclusion, the results of this study provide further indication that individuals should be cautious of spending too much time on social media. It is recommended for future studies to repeat the same experiment with a larger number of participants to gain a more accurate understanding of the correlation between social media and self-esteem.

Keywords: self-esteem, social media, societal standards, mental health

1. Introduction

The use of technology has increased rapidly from the time the first Apple computer was created in 1976 (Weinberger, 2020). According to Kuss and Griffiths (2011), over one-third of the world's population has at least one social media account. The rapid growth of technology and social media has enabled individuals to start their first social media accounts at an increasingly young age. However, many of the founders of tech companies refuse to allow their own children to open accounts on such social

platforms (Hern, 2018). So, it is important to question the reasoning behind the ban of social media that these tech moguls partake on their children and to consider the ramifications of media exposure at a young age. Several studies suggest that the amount of time spent on social media by the youth has skyrocketed since the 1990s to this day (Baran, 2013). Social Media apps routinely bombard individuals with unrealistic appearances, idealized social lives, and lavish lifestyle standards (Amazue, 2014). As a result, excessive social media use can negatively impact an individual's self-esteem.

2. Literature Review

2.1 The most common reasons for social media practice and the impact of excessive use

Individuals are generally drawn to social media for the purpose of entertainment, self-representation, and maintaining friendships (Ward, 2017). Social media applications and websites provide an efficient platform for socializing, sharing ideas, and expanding friendships regardless of how close or far individuals are from each other (Tian et al., 2019). Social networking sites such as Facebook, Instagram, Twitter, and many others allow users to "like" content to make it favorable among the youth (Burrow & Rainone, 2017). In recent years, social media has become a more popular form of socialization than previous activities, such as calling on the phone, writing letters, and meeting in person (Ahmad et al., 2018). Several studies indicate the replacement of face-to-face interaction with sterile forms of online socialization can have negative implications to the individual (Solomon, 2016). Studies show that the more frequent individuals view social networking sites, the more they experience a decline in self-esteem and life satisfaction (Haigh et al., 2017). Furthermore, researchers suggest that posting selfies can further deplete an individual's self-esteem (Sung et al., 2016). Selfies have been described as a form of seeking validation from others, but commonly worsen the individual's insecurities and loneliness. (Sung et al., 2016).

2.2 The impact of social media on perceived self-esteem

Studies indicate individuals that are highly active on social media have low self-esteem (Amazue, 2014). Constant comparison to other individuals online and in the media can lower an individual's self-esteem, especially if an individual feels they are not able to reach societal standards (Amazue, 2014). According to Festinger's comparison theory (1954), when individuals compare themselves to people that are profoundly different from

them, they will not be able to accurately assess themselves. Moreover, evidence indicates that increased exposure to media leads to an increased likelihood of believing suggested media messages align with reality (Baran, 2013).

2.3 The impact of social media on mental health and self-confidence

Individuals who are unable to achieve the quality of life portrayed in social media may experience mental health problems and self-hatred (Laohapongphan et al., 2015). Adolescents in the process of bodily changes often compare themselves to people on social media, in films, and in advertisements (Amazue, 2014). In the process, they may feel devalued by the contrasting appearance of themselves and the people they view online. Adolescents are particularly at risk of losing self-confidence from excessive comparison as they are at the age of developing new cognitive thinking skills, which may make them think more critically of themselves (Ward, 2017). Furthermore, studies suggest women are the most at risk of losing self-confidence from excessive social media use because they are more likely than men to evaluate their personal value according to their body image (Sigelman & Rider, 2009).

3. Methods

3.1 Participants

The study consisted of 26 male and female university students between the ages of 18 to 25. The survey was delivered through Email, Messenger, and multiple Facebook groups. The research consisted of volunteer participants due to the fact that the questionnaire was optional, and individuals had the right to exit the survey if they felt uncomfortable at any time.

3.2 Materials

The data was collected through the means of an online survey. The questionnaire consisted of the Rosenberg Self-Esteem Scale which contained 10 questions. Individuals had the option to answer according to 4 levels of

agreement: (1) strongly disagree to (4) strongly agree. The second portion of the self-assessment consisted of the Social Networking Time Use Scale (SONTUS). The SONTUS assessment contained 20 questions in order to determine the amount of time an individual spends on social media.

3.3 Procedure

The survey was utilized to analyze the impact of social media use on self-esteem. The survey was distributed by email to students at various universities in Czech Republic. On the first page of the questionnaire, the participants were informed that their data is confidential and will remain anonymous. The survey took an average of 10 minutes. At the end of the questionnaire, the volunteers received an email debriefing them on the study.

4. Results

A correlation test was run to examine if there is a relationship between social media use and self-esteem. Initial inspection of the scatterplot indicates a linear relationship between the variables (see Figure 1). Scores for social media use and self-esteem were normally distributed, as assessed by Shapiro-Wilk’s test of normality ($p > 0.05$) (see Table 1). As a result, Pearson correlation coefficient was used (see Table 2). Social media use and self-esteem were inversely significantly related, $r = .542, p = .004$ (see Table 2). The hypothesis was accepted.

Figure 1

Scatterplot for Social Media Use and Self-Esteem

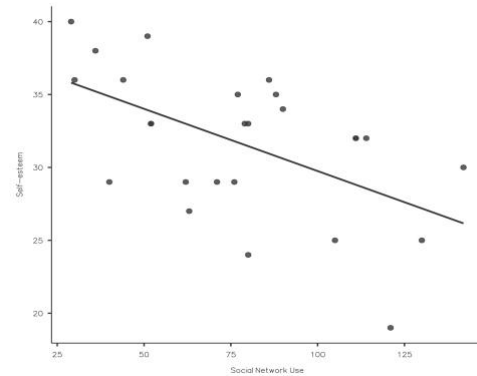


Table 1

Shapiro-Wilk’s Test of Normality for Social Media Use and Self-Esteem

	Self-Esteem	Social Media Use
N	26	26
Shapiro-Wilk p	.534	.546

Table 2

The Pearson Correlation Coefficient for Social Media Use and Self-Esteem

		Social Media Use	Self-Esteem
Social Media Use	Pearson’s r	–	
	p-value	–	
Self-Esteem	Pearson’s r	-.542	–
	p-value	.004	–

5. Discussion

The results of this study suggest that increased exposure to social media decreases self-esteem. The participants in the study that spent the highest amount of time on social media portrayed higher tendencies of self-doubt in comparison to those that spent less time on social media. These findings support the postulated hypothesis and corroborate previous studies that suggest social media can adversely influence self-esteem.

6. Conclusion

The findings of this study provide further indication that excessive social media use can result in depleted self-esteem. Future examinations are necessary to assess the relationship between social media and a person's self-confidence in order to achieve a more accurate representation of the population due to the small number of participants in the current study. It is also necessary for future studies to aim to be as inclusive and accessible as possible in order to improve the level of randomness in the results. Moreover, the findings of the study are useful in determining the impact of social media on self-esteem. The knowledge of social media implications can help individuals better prepare themselves to handle the pressure of beauty standards and toxic comparison that manifest on social applications, such as Instagram, Snapchat, and Facebook. It could be beneficial to educate young men and women to change their outlook on their appearance rather than trying to change their bodies to fit current trends portrayed in the media. With the findings of the study, programs can be instilled to teach adolescents to focus on finding personal value internally rather than based on appearances. It is prudent to educate the youth how to handle the pressure of beauty standards portrayed online and to be cautious of spending too much time comparing their lives to the highlights of other people's lives, especially in regard to perfected and occasionally photoshopped images on social media.

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Coaching Resilience in Czech Tennis Players

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Abstract

Resilience is becoming an increasingly popular concept in Business and Sport Psychology alike. However, there is still not a clear understanding of what exactly resilience is and how it can be fostered and developed. In this qualitative study, semi-structured interviews were conducted with professional tennis coaches to better understand how resilience can be coached and nurtured. Thematic analysis revealed 7 factors influencing resilience. Four active factors (strategies that coaches implement) such as mental imagery or pressure; specifically used to improve player's performance and allow them to focus at all times. Three passive factors (passively affecting athlete's performances) such as support and stress. Passive factors are elements that alter player's performance whether they want it or not. Results of this study show that resilience is a complex factor that can be nurtured and improved under the right circumstances, and coaches with a thorough understanding of mental skills can hugely improve athletic performance.

Keywords: Resilience, Thematic Analysis, Tennis, Active factors, Passive factors

1. Introduction

This study will focus on coaches' experience with resilience and their approach toward it. It will analyze resilience in a qualitative study based on interviews with professional tennis coaches in the Czech Republic. The field of sport psychology is still a rather new area of psychology, but it has gathered a lot of attention and more and more professional athletes are working with sport psychologists to improve their game. In sport psychology, one of the most discussed concepts is resilience. This concept is studied and applied in wide areas of life and it is important for business, personal life, and sport achievement. Even though a lot of research has been done on resilience it is still unclear whether it can be learned and

nurtured or if it is a trait that each individual possesses on different levels.

2. Literature Review

There have been many attempts to define resilience from a psychological perspective. However, all the definitions are made up of two important parts - facing hardship and positive adjustment to it (Fletcher & Sarkar, 2013). There has also been a discussion whether resilience is a trait or a process. At the beginning of the 21st century researchers tend to understand resilience as a trait concept. For example, Connor and Davidson describe resilience as a characteristic that differs across persons and changes with age. They also suggest resilience stems from individual life circumstances, and that these circumstances can strengthen

or weaken the trait (Connor & Davidson, 2003). However, their idea was that resilience is more of a hereditary concept. On the other hand, Luthar understands resilience as a process of adaptation against adversity. In his view, resilience is a fluid concept where the result depends on the circumstances. Luthar also proposes that resilience can change based on environmental influences (Luthar, 2006). Luthar's perspective has informed this study and has informed my enquiry whether resilience is affected by environmental causes such as the coach's or psychologist's intervention. Finally, Fletcher and Sarkar add that psychological resilience relies on promoting positive effects and protecting the individual from negative stressors. Additionally, both personal factors (such as confidence), and environmental factors (such as social support), interact and affect resilience (Fletcher & Sarkar, 2013).

Can resilience be coached? In a study from 2018, researchers focused on resilience trainings that can affect the brain. Biologically, resilience is based on the interaction between reflective (C-system) system and reflexive (X-system). C-system oversees controlled process, whereas X-system controls automatic processes. In times of adversities, the X-system takes control over the C-system to help resolve the situation at hand, (Tabibnia & Radecki, 2018). Prolonged times of adversities and stress where the X-system takes over can be damaging to the brain both psychologically and biologically. Researchers focused on four ways to improve mental health and resilience – behaviors and habits, cognitive strategies, physical health, and social behaviors. In conclusion they found three main points to focus on when coaching resilience to clients: Positive expectations, growth mindset and self-affirmation (Tabibnia & Radecki, 2018). This shows that there are strategies supported by research to focus on when facing adversities. Trainings such as mindfulness meditations, exercising, and social contact, can all help our brain benefit and develop a stronger shell

against adversity. It also shows how important it is to focus on the mental side of sports to prevent stress and adversity from limiting our performance and possibly damaging our body. Further research illustrates the ability to learn from stressful events to enhance individual coping efforts and resilience. Researchers showed that exposure to natural stress leads to learning, enhancement of plasticity in prefrontal development, and expansion of a region of cortex which manipulates arousal regulation and resilience (Katz et al., 2009). Therefore, the ability to learn from anxiety and strain is natural, and coaches can and should implement stress training into athletic regimens to improve resistance to stress.

Coaching resilience in a structured way can be achieved by using mental fortitude training. Fletcher and Sarkar attempted to use mental fortitude training to develop resilience in athletes: "The mental fortitude training™ program focuses on three main areas – personal qualities, facilitative environment, and challenge mindset – to enhance performers' ability to withstand pressure" (Fletcher & Sarkar, 2016, p. 4-5). Researchers in this study focused on developing personal qualities in individuals for them to be able to resist stressors. They also focused on environmental factors that facilitate support and challenge athletes, and in correct combination they do not affect their well-being (Fletcher & Sarkar, 2016). Their program focused on allowing individuals to assess and interpret the pressure with their mindset to help them develop their own strategies against stress (Fletcher & Sarkar, 2016). Researchers applied the mental fortitude training in the preparation of Olympic athletes in 2012 and 2016. Finally, Fletcher and Sarkar stress the importance of debriefing athletes to help them understand the intricacies of resilience and that being prone to stress is not a weakness. They also noticed that resilience trainings such as mental fortitude should always be tailored to everyone's needs (Fletcher & Sarkar, 2016). Fletcher and Sarkar's research is critical for an understanding of resilience trainings and

interventions. It also points out the need to understand athletes on a deep level to adapt different resilience interventions based on athlete's needs. For example, in a tennis environment, junior athletes often play worse in the presence of their parents and show signs of stress and anxiety due to environmental and individual stressors. This issue usually resolves itself later in life as athletes mature, however initially it can cause anxiety to the athlete, and even lead to complete abandonment of the sport. If athletes struggle with this problem, resilience interventions such as bringing parents more often into practice and allowing for a frequent discussion between parents and their athlete can solve this issue. However, this requires the coach to know his/her players intimately to plan individual interventions.

Cowden and Meyer-Weitz (2016) further developed our understanding of the relationship between self-awareness, resilience and stress in 333 professional South African tennis players. Self-awareness has been split into self-reflection and self-insight. Their hypothesis was that both self-reflection and self-insight will be positively correlated with resilience, and that these factors will collectively predict resilience (Cowden & Meyer-Weitz, 2016). Their results showed that both self-reflection and self-insight were positively correlated with resilience, however only self-insight predicted resilience (Cowden & Meyer-Weitz, 2016) This implicates that self-insight might be more important in athletes to build resilience and help them handle stress. It is also important to note, that this study had a sample of only tennis players, therefore replicating this research in team sports could show entirely different results. Athletes in team sports can rely on their teammates which can reduce or increase the burden of stress and anxiety depending on the personality of the individual in critical moments of performance.

3. Methodology

3.1 Participants

Sample of participants consisted of 5 coaches, aged between 24 and 75. All participants are from the Czech Republic. The method for gathering participants was convenience sampling, however, the coaches were selected to cover both the professional and recreational side of tennis. All participants have more than 10 years of experience playing professional tennis or coaching as their livelihood. Two of the coaches specialize in coaching recreational players and children (RC). One of the coaches specializes in coaching veteran players (VC), and two coaches focus on professional athletes (PC).

3.2 Procedure and Data Collection

The interviews were conducted at a time convenient for the participants and all took place over skype. The main reason for interviews being conducted online was the epidemic of Covid-19, which hindered the possibility of having face-to-face interviews. All interviews were recorded and three of them were undertaken with the face camera turned on. Gathering data began by distributing an online letter of consent and basic information about the nature of the research. After all participants agreed to the interview, they were invited to the online interview. Participants were then asked to introduce themselves, their tennis achievements and anything they thought was relevant to the interview. After that, the questions asked, were taken from previous research by Kegelaers and Wylleman, where they utilized a semi-structured interview for coaches, athletes and sport psychologists. The questions were in English language and approved by the original researchers.

3.3 Data Analysis

The interviews were transcribed and stored on a safe online portal for analysis. Similarly, to the study of Kegelaers and Wyleman, thematic analysis was used in this

study. Thematic analysis is a qualitative analytic method used in psychology, that is similar to the grounded theory approach. However, unlike grounded theory, thematic analysis is not bound by theoretical commitments. Thematic analysis can be used within multiple theoretical frameworks, it is a method that reflects reality and interprets various aspects of the topic (Braun & Clarke, 2006). The creation of themes was undertaken according to the guidelines proposed by Braun and Clarke. Therefore, the process started by reading and rereading the transcriptions. From this data, codes were created by taking key phrases and examples from the coaches and labelling them. Further in the process, codes were clustered into themes. These themes were updated as the process continued by additional rereading of the material. For each theme, a definition was created with an example to better illustrate the meaning of the theme. Finally, themes were created and interpreted with the aim of discovering fundamental notions about mental resilience and factors influencing it (Braun & Clarke, 2006). The next step was to separate these themes into passive factors and active factors. Passive factors influence mental resilience constantly, they are factors that athletes or coaches are often unaware of and cannot control. Passive factors can influence mental resilience positively or negatively. They are underlying issues that athletes face. An example of a passive theme is Trauma. Active factors are factors that coaches and athletes implement to hopefully improve their mental resilience and performance. They are often applied to specifically deal with a passive factor negatively influencing performance. An example of an active theme is Pressure Training. The researcher then listed these themes according to the frequency of appearance in individual interviews. The researcher kept an inventory of themes supported by coaches' responses, which helped showing the prevalence of the theme. The final step was to write up the findings and present participants' notions on mental resilience and factors affecting it.

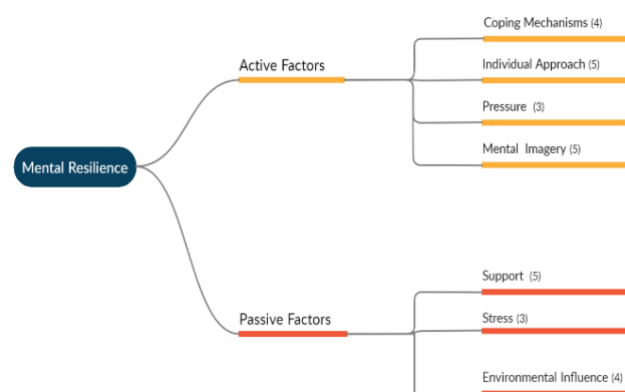
4. Results

4.1. Factors

Thematic analysis revealed four factors that coaches implemented in their trainings. These factors are: Coping Mechanisms, Individual Approach, Pressure and Mental Imagery. Numbers in brackets show the number of coaches that use these techniques, (see Figure 1). Thematic analysis revealed three factors that coaches recognize, affecting performance in athletes. These factors are: Support, Stress and Environmental Influence. Once again, the numbers in brackets show the number of coaches that mentioned these factors, (see Figure 1).

Figure 1.

Active and Passive Factors



4.1.1 Coping Mechanisms

Coping was defined as cognitive and behavioral efforts to endure stressful situations (Smith & Lazarus, 1990). Therefore, coping mechanisms or strategies are methods athletes use to handle mentally taxing situations. Previous studies showed that both elite and recreational athletes attempt to use coping strategies as a means to lower competitive anxiety (Galli & Vealey, 2008; Mummery et al., 2004; Ntoumanis & Biddle, 2000). In this study, coping mechanisms are methods used both before performance and during performance. Four of the coaches in this study said that they teach their athletes coping mechanisms to

improve performance. One of the coaches talked about an example where he implemented controlled breathing as a coping mechanism to help his female athlete win a match:

“It all depends on breathing exercises. If a player struggles in a match and develops tension in muscles due to anxiety, she must utilize a breathing technique to calm down and relax the muscles. Controlled breathing helps the body to relax and refocus. If athletes cannot learn how to relax when needed they will never manage to win at the top level. After a month of working on breathing techniques, she played a practice match against a stronger male opponent, and she managed to win. After the match she told me that the focus on breathing during the second set tie-break helped her overcome tension” (PC).

Mediation and controlled breathing are only a part of many techniques’ athletes can use to cope better. In a study from 1996, researchers showed that positive goal attainment was a successful strategy for many British competitive swimmers (Jones & Hanton, 1996). Another study attributed the success of professional athletes to coping strategies such as relaxation, arousal control or wishful thinking (Crocker et al., 2015). In a different study, researchers found that motivational self-talk was an effective tool for professional martial-art athletes (Hanshaw, & Sukal, 2016).

4.1.2 Individual Approach

Another active factor found in this study was the individual approach. This technique was mentioned by all five of the coaches as paramount to success at all levels. As an example, one coach explains the importance of the individual approach in her coaching:

“Tennis is an individual sport. This gives us coaches an opportunity to find a way to approach each one of our athletes in a unique way that works for them. With one athlete I functioned on the basis of a confidant, because she struggled with family problems and stressful work

environment. My goal was to teach her to enjoy tennis once again and when playing tennis to forget about the outside world and it’s problems” (VC).

This example shows a personalized approach to athletes, a technique that coaches in this study consider mandatory to gain the trust of their athletes and knowledge about their lives. Previous research suggests that resilience and performance is affected by individual factors (Connor & Davidson, 2003; Stoker et al., 2016).

4.1.3 Pressure

This is another active factor, also known as pressure training, which in this case means artificial adversity created by coaches to see how athletes perform under stress. Previous studies show that training under mild anxiety fortifies athletes and maintain their performance in key moments. Practicing under changing circumstances, and under varying amounts of stress, also helps athletes develop their own coping mechanisms (Oudejans & Pijpers, 2010). In another study, researchers investigated concrete techniques coaches used by elite coaches to create pressure. Their results show that coaches manipulated variables to generate environmental changes and included rewards or punishments to see how athletes react (Stoker et al., 2016). Similarly, Fletcher and Sarkar support creating a pressure environment in their mental fortitude trainings (Fletcher & Sarkar, 2016). In this study, one coach illustrated his use of pressure with elite athletes:

“One of my players (at that point ranked around 500 in the world) said that he feels an increasing amount of stress when playing important points in matches. So, I started implementing what I call Big Points into our trainings. Basically, whenever he was winning in practice, I switched the score on him to make him play from behind. We also practiced starting at a higher, tighter score to imitate the pressure of big points in real matches. It took us around six months in and off the tour to slowly fix this issue” (PC).

This example demonstrates two specific tactics to create an environment of pressure – big points and switching scores. Two other coaches used these tactics, one focuses on big points and the other talked about trying to unsettle his athletes in order to evoke stress and anxiety. Pressure training can be a difficult issue and could easily be misused especially with younger athletes. However, with experienced coaches and a performance-based environment, this factor can hugely contribute to the mental growth of athletes.

4.1.4 Mental Imagery

Mental imagery or visualization is a technique that most elite athletes perform on a daily basis. It is especially prevalent in sports such as bobsledding, where professional athletes are unable to practice very often due to the high pressure and speed of the sled. Visualization helps them reproduce the effect of practice and becomes an invaluable tool. Mental imagery is an experience that simulates sensory and perceptual experiences. It can combine all sensations (Gregg & Clark, 2007). In a study from 2007, researchers examined the effects of mental imagery and self-talk in trained martial artists. Their results show that imagery and self-talk significantly reduce response times (Hanshaw & Sukal, 2016). Also, previous studies show that visualization is a tool used by elite athletes across many sports and it is linked to increased performance and mental resilience (Crocker et al., 2015; Fletcher & Sarkar, 2016; Mummary et al., 2004). In the current study, one coach uses mental imagery to help junior recreational players learn advanced technique:

“Usually, most players struggle to learn the proper serve motion. It gets even harder when they have to learn the proper rotation to get the ball to bounce high. It is almost impossible to teach this in the limited time you have with your athletes, so I always give them some homework. Practice the serve motion with different rotations in your mind. It also helps, to look at yourself in the mirror

sometimes to help you better imagine it the next time. It takes time but usually it helps players understand what motion the racket has to do; how high you should toss the ball and when is the ideal time to hit it” (RC).

Mental imagery is a multifaceted tool that has many benefits. It can help players calm down before a match, help them learn a technique or fix an already existing issue. It can also help prepare them for what they have to face. In this research, all five participants use mental imagery with their athletes and for themselves.

4.1.5 Support

Support is a passive factor that influences performance and resilience on a daily basis. It involves both positive and negative elements. In the context of this study, it is a very broad grouping of elements affecting athlete’s resilience. In this study it was found that elements affecting performance and resilience were mainly depending on support from family and peers or the absence of it. Another element was related to work or school issues and spouse problems. Previous research shows the paramount importance of social support. In a study from 2016, researchers interviewed top tennis coaches to better understand the role parents should play in a junior athlete’s development. Their results show that parents should aid their children in further development and encourage them at all costs. They also indicate that parents project their wishes on children and emphasize winning too much (Gould et al., 2016). This is a common pattern across many sports, and it can damage self-esteem in children and cause their premature retirement from the sport. In the current study, one coach gives an example of negative social support:

“Kids perceive criticism differently from a coach and their parents. One of the worst combinations that can happen in a practice session when both the coach and his/her parents want to give the kid advice. This way their self-confidence suffers, and it can lead to many issues.

However, I also understand the parent's point of view because they are paying good money for practice sessions. They just need to start trusting the coach and let go. Their job in the kid's world is to be supportive at all costs, understand them and help them" (PC).

All five of the coaches in this study mentioned support as a critical factor in the development of mental strength and resilience especially in junior athletes. Previous research also suggests the importance of social support influencing and interacting with resilience (Fletcher & Sarkar, 2013; Galli & Vealey, 2008; Sarkar & Fletcher, 2014). Support comes in many forms and an athlete might rely on it from his/her peers, parents, or spouses.

4.1.6 Stress

Stress is another factor found that constantly changes an athlete's approach in practice and matches. Professional and recreational players alike are almost always struggling with some issues in their life. This can easily lead to burnout, and in junior athletes, the risk of burnout is even higher (Gustafsson et al., 2015). In the current study, one coach talked about how his junior athlete, preparing to become a professional tennis player, struggled with stress:

"He came to practice one day, and I immediately knew that this is going to be a bad day. After practice we talked, and he mentioned struggling with schoolwork and the added pressure from his parents. I told him that he is going to always encounter these problems, and he needs to find a way to let them go when needed. If you come to practice with your head filled with stuff you need to do after, your performance is going to be worse. And rightfully so! Players need to know that when you come here, there is nothing else but tennis. Once they learn this, they start to accept stress and perform steadily" (PC).

This example shows how important it is to manage stress for best performance and the pressure these athletes have to endure. Previous research shows that stressors can

be divided into three categories – personal, organizational, and competitive (Sarkar & Fletcher, 2014). In this example, an athlete struggles with personal issues affecting his performance.

4.1.7 Environmental Influence

Final factor found in this study was Environmental Influence. This factor relates to both nature and nurture in the genetic predispositions of the athlete, and environment in which the athlete was brought up. Four out of the five coaches mentioned that genetics, and the way parents socialize their children, shapes their mental toughness and resilience. One of the coaches also believed that genetic predispositions are the main factor of resilience in athletes, which is why he does not teach mental preparation:

"I think that mental resilience or toughness or whatever you want to call it is almost solely dependent on the upbringings of a child and genetic factors inherited. I believe that everyone has been given a base of mental skills and these can be slightly improved by their experiences. However, I do not think I can contribute much to the development of these skills. I think that they are already there, and I cannot influence his or her natural way of dealing with problems," (RC).

Another coach offered a different view on Environmental Influence:

"The absolute basis for our work with athletes is where they came from and how they view the world. Their parents shaped them and their behavior in a certain way and it is our job to understand that to help us better work with each individual athlete" (PC).

5. Discussion

The goal of this study was to explore resilience in a tennis environment in relation to performance. Thematic analysis identified active and passive factors that influence resilience. Active factors were defined as tactics and

strategies that coaches implement to improve resilience in athletes. Passive factors were defined as elements that influence athletes daily. The data gathered in this study allowed this research to explore resilience from the view of professional coaches who revealed specific manifestations of resilience and tools that enhance or lower it. This data showed that mental aspects of performance are key in every athlete and proper use of these strategies can help athlete focus and improvement.

The participants of this study were all professional coaches with many years of experience both playing and coaching. The goal was to get a varied sample of coaches to see whether their opinions differ when it comes to resilience and its use in tennis. Two of them were professional players before they started to coach junior elite athletes that aspire to become professional tennis players (PC). Two coaches focus on teaching casual and junior players with a focus on basic tennis technique (RC). Finally, the last coach is a renowned teacher and expert that coached tennis for more than 50 years and currently focuses on veteran athletes (VC). All participants agreed that resilience and other mental abilities are a critical part of sports performance. This is in accordance with previous research done on mental toughness (Slimani et al., 2016) and resilience (Fletcher & Sarkar, 2013), (Mummery et al., 2004). However, they differed on one fundamental issue. Their approach toward resilience and other mental skills in athletes. Both PC practiced advanced methods such as two of the active factors – Coping Mechanisms and Pressure. They also had some theoretical background on how to increase mental skills. The other three coaches used some tools to enhance mental abilities, however they possessed no formal and theoretical knowledge about them, and often did not realize that they are coaching mental aspects. In the interviews there were often parts where coaches made statements such as: “He won because of his talent and skill”, or “He played great because we practiced every day, and his backhand was superb”. There is no denying that

athletes must perform well to win matches, however, none of these coaches seemed to attribute any victories or great performances to mental skills. It might be as simple as coaches being proud of the physical work their athletes have done or there might be an underlying issue of minimizing the effects of resilience and toughness.

On the other hand, all coaches seemed to understand the value of an individual approach toward athletes. Tennis is by its nature a lonely sport, but it is essential that coaches across every sport realize the need to connect to players and try to understand their motives to better coach them. This is a concept that has been supported by previous research. For example, a study from 2018 focused on athlete-centered coaching, where coaches should often ask athletes and interact with them instead of giving instructions, (Light, 2018). Another study from 2020 indicates that while traditional coaching is still dominant, individual approach utilizing engaging athletes and effective communication showed promising results (Stone et al., 2020).

Based on this research, resilience seems to be a fluid concept. Four out of five coaches also see resilience as a developing process, thus suggesting that resilience is more of a process instead of a trait. In 2006, Luthar defined resilience as a positive response to adversity (Luthar, 2006) and in this study, coaches have shown examples where their athletes had to overcome such adversity. Fletcher and Sarkar in 2013, also agreed that while resilience has many definitions, positive adjustment to adversity is paramount in this definition (Fletcher & Sarkar, 2013). Therefore, resilience is based on hardship and the subsequent reaction and adaptation against it. One active factor in particular – Pressure, offers another technique that should improve performance in athletes by inducing artificial pressure and seeing how well the players adapt to it. In 2016, Fletcher and Sarkar tested Mental Fortitude training to achieve similar effect in athletes (Fletcher & Sarkar, 2016), once

more showing that resilience is not an unchangeable object and with correct techniques it can be improved. In future research these techniques are paramount for a better understanding of resilience and development of competitive mindset in athletes.

5.1 Limitations

This study utilized thematic analysis to analyze resilience in a professional tennis setting. However, it did not account for gender and age differences that help understanding the differences between coaches. The sample size was also very small due to limited time and Covid-19 restrictions. Because of the ongoing spreading of Covid-19 all interviews were done over zoom which slightly limited social interactions during the interviews. This study utilized an interview form from another qualitative study on resilience (Kegelaers & Wylleman, 2019). The researchers were informed and knew that their interview form was used in the present study.

For future research, a larger sample should provide more data about coaching techniques and understanding of mental aspects of performance. In addition, future studies can divide coaches according to their specialization (whether they coach recreational players, juniors, professional players, or veteran players) to see how does coaching change across these variations. Furthermore, a different interview form can be used when interviewing coaches about mental resilience to analyze the results from a different perspective.

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Nightmares: Risk Factors and Functions

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Abstract

A substantial body of research of the past decades shows that nightmares play an important role affecting people's well-being, however their functionality and predictive factors remain uncertain. This can be a point of concern as frequent nightmares are often connected with mental disorders and suicidal inclinations. Whilst the functionality of nightmares remains uncertain, as theories range from the disruption in functioning to a resource to deal with emotionally difficult events. Therefore, this study was focused on the risk factors that can be considered to play a role in the frequency and the disturbance of nightmares, such as high levels of stress, certain personality traits, and trauma. The results showed that these risk factors significantly predicted nightmare frequency and disturbance. Traumatic experiences were the strongest significant predictor for the disturbance of nightmares, and stress was the strongest significant predictor of frequency. Further investigation with the most prominent risk factors may later help to recognize the most vulnerable groups quicker and provide support for them.

Keywords: nightmares, risk factors, trauma, disturbed dreaming, stress.

1. Introduction

Nightmares play an important role in affecting the persons' well-being during the day, yet their functionality and risk factors connected to their frequency and disturbance are not understood and identified fully to date. Nightmares are vivid and highly negative dreams from which the dreamer is awakened, which is the factor that separates them from bad dreams (Nielsen, 2016), in addition to the impairment of daily life. With about 85% of adults reporting to have had nightmares within a year, 3 to 8% of the population have reported it to be a weekly occurrence, which leads to impaired waking hours but does not constitute a disorder (Levin & Nielsen, 2009).

That being said, the functionality of nightmares remains uncertain, as theories range from the disruption in functioning to a resource to deal with emotionally difficult events. Furthermore, there are a lot of risk factors that can be considered to play a role in the frequency and the disturbance of nightmares, as they encompass stressful waking experiences, cognitive style, personality traits, and trauma. As nightmares are also often connected with mental disorders and suicide inclinations, identifying the most prominent risk factors in this case and seeing the functionality of nightmares will, later on, help to recognize the most vulnerable groups quicker and provide support for them. Thus, this study will focus on these risk factors, suggesting that they will predict nightmare frequency, with

personality being the strongest factor. Moreover, these factors will predict nightmare disturbance, with trauma being the strongest predictor.

2. Literature Review

2.1 Prevalence Among the General Population

Nightmares are intense and vivid dreams with strong negative emotions, usually eliciting a sense of danger and fear, from which the dreamer is awakened (American Psychiatric Association, 2013). This definition is quite narrow, as it does not account for other frequent emotions, such as anger and sadness (Nielsen & Carr, 2016). For this reason, in this study the definition of nightmares is close to the definition of bad dreams. It also should be mentioned that distress from nightmares correlates with their perception by the dreamer (Schredl et al., 2019), making the impairment in daily life more evident.

The frequency and distress of nightmares depend on many factors, as Li et al.'s (2010) research has shown for age, gender, and financial situation in the general population. Among adults, 3-8% have nightmares during the week, yet nightmares decrease with age (Schredl, 2009 as cited in Thünker et al., 2014; Li et al., 2010). On the contrary, most prominent are children from five to ten years old, who report experiencing nightmares once a week (Schredl, 2009). Furthermore, women are more likely to report having frequent and more distressing dreams than men (Levin & Nielsen, 2007; Li et al., 2010; Thünker et al., 2014).

The problem of frequent nightmares becomes evident with the impaired functioning during the day yet does not constitute a nightmare disorder. Whereas there is the possibility of a vicious cycle of experiencing a nightmare, getting more stressed during the waking hours and triggering nightmares again in the night-time, as often happens with PTSD patients (Li et al, 2010). With that in mind, it has been observed that in the clinical population

the rate of nightmares is higher, as they are often associated with other disorders (Levin & Nielsen, 2009; Thünker et al., 2014). An additional concern is the association of reports of frequent nightmares and the increased suicidal ideation and suicidal attempts, independent of other PTSD symptoms (Nielsen & Carr, 2016; Wagener, 2019).

2.2 Risk Factors for Nightmares

2.2.1 Trauma and Stress

The risk factors for frequent and disturbing nightmares cannot all be pointed out, as they vary from waking life experiences and stress, traumatic events in the past, and personality traits, usually closely connected to neuroticism and anxiety. In case of the PTSD, high nightmare disturbance and frequency is to be expected; however, just trauma in the past also plays a part in disturbance of nightmares (Wagener, 2019). Alongside trauma adverse experiences in childhood should be also included, as Nielsen (2017) proposed, because the vulnerability for nightmares can be triggered by those experiences. On the other hand, stress and anxiety of daily life play a major role in nightmare frequency, as shown by Li et al.'s (2010) study on the population of different financial status and living arrangements. Moreover, a higher nightmare frequency is among those who have poor sleep quality, depressive and anxiety symptoms (Schredl, 2009, as cited in Nielson & Carr, 2016; Li et al., 2010; Li et al., 2013).

2.2.2 Personality Traits and Cognitive Style

A different approach is the association for waking life stress and pathologies already present, as often nightmares are considered to be a symptom of psychological disorders, specifically mood disorders. As well, nightmare frequency is associated with a personality and cognitive style that has intense reactive emotional distress (Nielsen et al., 2000; Levin & Nielsen, 2007). Many studies also show a correlation between personality type and nightmares, as they are more likely to occur for neuroticism and

schizotypal personality types (Li et al., 2010; Kelly, 2016). This could be again explained by the cognitive style and the way the information is processed and then portrayed in the nightmares.

2.3 Functionality of Nightmares

The discussion regarding the functionality of nightmares is quite important to note, ranging from Freudian psychoanalysis to completely biological ones, yet the theories do have a common ground on the function of defense or coping interpretation. To illustrate, Freud's (1900, as cited in Kelly, 2016) influential idea for function of dreams is about the deep unconscious disturbing wishes that can only be shown in dreams in symbolic forms. Levin and Nielson (2007) proposed a neuro-cognitive model that explains nightmares as the brain's means to extinguish the "fear-related memories" (p.3). All in all, most theories on nightmare function suggest them providing some sort of defense or a mechanism to work through painful or deeply unpleasant experiences (Kelly, 2016; Nielsen & Carr, 2016). However, the ones with the most evidence are the fear-memory extinction and image contextualization theories.

As mentioned earlier, the fear-memory extinction theory is mostly aimed at re-living stressful situations in the new context provided by imagination. Of note is that recurring nightmares occur when this process is impaired (Levin & Nielsen, 2009). The function of nightmares, in this case, is to create an environment in which emotionally disturbing memories are played out but in a new, different context, which makes it easier to re-live and provide fear-memory extinction (Wagener, 2019). The second important theory is image contextualization, which relies more on a helpful side of the role that emotions play in dream formation. These kinds of nightmares are adaptations to emotional experiences, as in cases with bad waking life experiences and trauma.

The aim of this research is to identify the most prominent risk factors and see the implications for the functionality of nightmares, which will, later on, help to identify those most vulnerable to frequent nightmares and provide support for them. Based on previous research, the hypothesis of the current research is that stress, personality type and trauma will together significantly predict nightmare frequency, with personality being the strongest predictor. Moreover, these factors together will significantly predict nightmare disturbance, with trauma being the strongest predictor.

3. Method

3.1 Participants

One hundred twenty-six subjects participated in this study, 97 (77.2%) of them were female, 24 (18.9%) were male, 4 (3.1%) were non-binary and 1 (0.8%) preferred not to disclose their gender. Age ranged from 18 to 55, with the mean being 25. Subjects were not limited by any parameters other than being at least 18 years old. All participants submitted their informed consent before engaging in the study.

3.2 Materials

3.2.1. *Nightmare Frequency and Distress*

To measure nightmare frequency, an eight-point frequency scale (0 = never, 1 = less than once a year, 2 = about once a year, 3 = about 2 - 4 times a year, 4 = about once a month, 5 = about 2 - 3 times a month, 6 = about once a week, and 7 = several times a week) was used. It has valid psychometric properties according to Stumbrys et al. (2013).

To measure nightmare distress, a brief questionnaire, which consisted of 3 questions was presented. Participants answered how distressing they find their nightmares to be, how much nightmares affect their psychological well-

being and their daily life with a five-point scale (0 = none, 1 = low, 2 = medium, 3 = high, and 4 = very high).

A specific definition of nightmares, according to APA (2013), was provided for the participants.

3.2.1. *Personality, Stress, and Trauma*

To measure personality, the Big Five Inventory (BFI) test was used. It consists of 50 items that subjects rate on how true they were about them on a five-point scale (1 = disagree strongly, 2 = disagree a little, 3 = neutral, 4 = agree a little, 5 = agree strongly).

For stress measurement, the Perceived Stress Scale (PSS) was used. It is the most widely used psychological instrument for measuring the perception of stress. It consists of 10 questions about subjects' feelings and thoughts to which participants answered with a five-point scale (0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often, 4 = very often).

For determining traumatic experience, the International Trauma Questionnaire (ITQ) was used. It contained 9 questions about problems that are often associated with traumatic experience. Subjects answered how much they were bothered by these problems on a five-point scale (1 = not at all, 2 = a little bit, 3 = moderately, 4 = quite a bit, 5 = extremely).

3.3 Procedure

Voluntary response sampling was used. Participants were asked to complete an online survey, which consisted of the previously listed questionnaires. The survey was created in Google forms and posted on social media, in specialized research participant gaining groups on Facebook and Reddit. The statistical analyses were carried out with Jamovi 1.6.6.

4. Results

4.1 Nightmare Frequency

A multiple linear regression was used to see if nightmare frequency can be predicted from personality traits, stress levels and trauma together, and if personality traits will be the strongest predictor.

There was no multicollinearity and no outliers. The assumptions of independence, linearity, homoscedasticity, and normality were not violated (see Tables 1-4; see Figure 1).

The results showed that personality traits, stress and trauma significantly predicted nightmare frequency, $F(6, 117) = 3.93, p = .001$, and these variables accounted for 12.5% of the explained variability of nightmare frequency (adj. $R^2 = .125$) (see Table 5). Therefore, the hypothesis 1 was confirmed.

However, stress was the only significant predictor of nightmare frequency ($p < .001$) with beta value of .3195 (see Table 6). Consequently, the second hypothesis was not confirmed.

Table 1

Collinearity Statistics for Stress, Trauma and Personality

	VIF	Tolerance
Stress	1.11	.900
Trauma	1.13	.888
Personality	1.02	.978

Table 2*Cook's Distance for Outliers*

Mean	Median	SD	Range	
			Min	Max
.00741	.00307	.00988	1.83e-9	.0469

Table 3*Durbin–Watson Test for Autocorrelation*

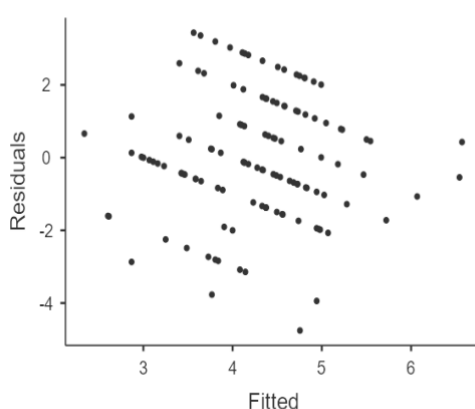
Autocorrelation	DW Statistic	p
.00827	1.98	.880

Table 4*Normality Test (Shapiro-Wilk) for the Residuals*

Statistic	p
.990	.512

Figure 1

Scatterplot for Linearity of Relationship between Variables, and Homoscedasticity of the Residuals

**Table 5**

Multiple Regression Results for Composite Personality, Stress, Trauma and Nightmare Frequency

Model	R	R ²	Adjusted R ²	Overall Model Test			
				F	df1	df2	p
1	.410	.168	.125	3.93	6	117	.001

Table 6*Multiple Regression Results for Separate Stress, Trauma and Personality*

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept *	.5416	1.5905	.3405	.734	
Stress	.1213	.0356	3.4107	<.001	.3195
Trauma	.0111	.0133	.8319	.407	.0790
Personality:					
Agreeableness – Extraversion	1.1244	1.2994	.8653	.389	.6069
Conscientiousness – Extraversion	.0210	1.3330	.0157	.987	.0113
Neuroticism – Extraversion	1.0308	1.3515	.7627	.447	.5564
Openness – Extraversion	.6782	1.2927	.5246	.601	.3660

Note. * Represents reference level

4.2 Nightmare Disturbance

A multiple linear regression was used to test if personality traits, stress levels and trauma together can predict nightmare disturbance, and if trauma will be the strongest predictor.

There was no multicollinearity and no outliers. The assumptions of independence, linearity and homoscedasticity were not violated (see Tables 7-9; see Figure 2). However, the residuals were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 10).

The results showed that personality traits, stress and trauma significantly predicted nightmare disturbance, $F(6, 117) = 4.84, p = .001$, and these variables accounted for 15.8% of the explained variability of nightmare frequency ($\text{adj. } R^2 = .158$) (see Table 11). Therefore, the third hypothesis was confirmed.

Moreover, trauma was the strongest significant predictor of nightmare disturbance ($p = .022$), since its beta value was the highest (.2171) among significant predictors (see Table 12). Consequently, the fourth hypothesis was confirmed.

Table 7

Collinearity Statistics for Stress, Trauma and Personality

	VIF	Tolerance
Stress	1.11	.900
Trauma	1.13	.888
Personality	1.02	.978

Table 8

Cook's Distance for Outliers

Mean	Median	SD	Range	
			Min	Max
.0108	.00388	.0291	1.23e-7	.219

Table 9

Durbin–Watson Test for Autocorrelation

Autocorrelation	DW Statistic	p
.0794	1.83	.356

Figure 2

Scatterplot for Linearity of Relationship between Variables, and Homoscedasticity of the Residuals

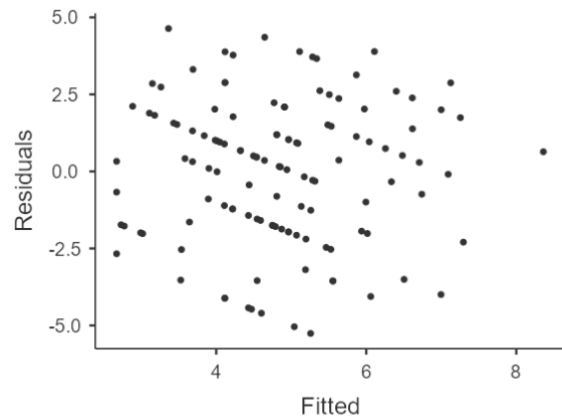


Table 10

Normality Test (Shapiro-Wilk) for the Residuals

Statistic	p
.980	.066

Table 11

Multiple Regression Results for Composite Personality, Stress, Trauma and Nightmare Disturbance

Model	R	R ²	Adjusted R ²	Overall Model Test			
				F	df1	df2	p
1	.446	.199	.158	4.84	6	117	<.001

Table 12*Multiple Regression Results for Separate Stress, Trauma and Personality*

Predictor	Estimate	SE	t	p	Stand. Estimate
Intercept *	.4544	2.1707	.209	.835	
Stress	.1069	.0486	2.201	.030	.2023
Trauma	.0422	.0181	2.330	.022	.2171
Personality:					
Agreeableness – Extraversion	1.2055	1.7734	.680	.498	.4678
Conscientiousness – Extraversion	.1873	1.8193	.103	.918	.0727
Neuroticism – Extraversion	.9856	1.8445	.534	.594	.3825
Openness – Extraversion	1.7310	1.7643	.981	.329	.6717

Note. * Represents reference level

5. Discussion

This paper investigated possible risk factors for nightmares, for the subsequent identification of people more susceptible to this phenomenon and the provision of timely assistance and support to such individuals. Since nightmares can often be associated with suicidal ideation and mental illness, identifying possible factors can be important in preventing negative effects from developing in vulnerable individuals. The literature review suggested that personality traits, stress and trauma are some of the most pronounced possible risk factors. Therefore, our hypotheses assumed that these criteria together would significantly predict nightmare frequency, with personality being the strongest predictor, and that these factors together would significantly predict nightmare disturbance, with trauma being the strongest predictor.

The first hypothesis, which implied that personality, stress and trauma together would significantly predict nightmare frequency, was confirmed ($F(6, 117) = 3.93, p = .001$). Which also confirms previous studies on this topic and supports the fear-memory extinction theory of nightmare functionality, since nightmare frequency seems to be related to the damaging experiences, such as stress and trauma (Li, et al., 2010; Nielsen et al., 2000; Levin & Nielsen, 2007; Wagener, 2019). However, these factors explained only 12.5% ($adj. R^2 = .125$) of the variability of nightmare frequency, which suggests the presence of a much larger number of risk factors. Moreover, when

considering these criteria separately, personality was not the strongest predictor, that is, the second hypothesis was not confirmed. In addition, of the factors studied, only stress was found to be a significant predictor of the frequency of nightmares ($p < .001, SE = .3195$). However, the second hypothesis could be refuted due to the small sample size and a nonrepresentative population, since voluntary response sampling was used, and the study participants were not controlled by any criteria other than being over 18 years old. Moreover, due to the fact that the BFI test consists of 40 questions and was the longest test in the questionnaire, it is possible that participants did not answer all the questions while giving them full attention, which could lead to inaccuracy in the results.

The third hypothesis suggested that personality, stress, and trauma would together significantly predict nightmare disturbance. In accordance with the literature review (Nielsen et al., 2000; Levin & Nielsen, 2007; Wagener, 2019), this hypothesis was confirmed ($F(6, 117) = 4.84, p = .001$), however, these factors corresponded to only 15.8% ($adj. R^2 = .158$) of nightmare disturbance, which also suggests the presence of other important factors. In addition, the fourth hypothesis that trauma will be the strongest predictor of nightmare disturbance has been confirmed ($p = .022, SE = .2171$), which is also consistent with information obtained from the literature review (Wagener, 2019; Nielsen, 2017). Moreover, stress was also a significant predictor, but was inferior in strength to trauma ($p = .03, SE = .2023$). Which can also be considered as support for the fear-memory extinction theory. Since stress and trauma significantly predicted nightmare disturbance, it could be that nightmares play a role of coping mechanism, which allows an individual to relive the unpleasant experience in different circumstances to cope with the damaging events and provide fear-memory extinction (Kelly, 2016; Nielsen & Carr, 2016; Wagener, 2019).

6. Conclusion

To conclude, this research has identified risk factors such as stress, trauma and personality traits that can significantly predict nightmare frequency and disturbance. Trauma was considered a significant predictor for nightmare disturbance, whereas stress significantly predicted the frequency of nightmares. This can hold implications for further research that can focus on the disturbance and distress caused by nightmares, with stress being an additional predictor. Additionally, this study has also shown that more risk factors should be considered.

There were limitations for this study. As this was an online questionnaire, the participants were not fully briefed on the definition of nightmares. They might have not read the definition given in questionnaire, and the same issue arises with questions on trauma. As noted earlier, the definition of nightmares given by DSM-5 is quite narrow (Nielsen & Carr, 2016), as it only includes the dreams from which a person is awoken from. Additionally, as the majority participants had English as the second language, it could cause some confusion and lead to inaccuracy in responding to the questionnaire. Moreover, the population in this study can be considered non representative, as the majority of participants was female, and the age of the participants was not normally distributed. Another limitation was that psychological disorders were not considered in this study, yet they can influence responses both in nightmare frequency and distress. Lastly, the limitation concerning personality traits, previous studies (Nielsen & Levin, 2009; Kelly, 2016; Lemyre et al., 2019) used different questionnaires to assess personality traits, which can partially explain why the second hypothesis was not confirmed.

As the objective of this study was to identify the risk factors that can predict nightmare frequency and disturbance, it should lead to further research on this topic.

It is especially important for further research to investigate the association between nightmare frequency and disturbance and suicidal inclinations. It can be done on already identified groups with high levels of stress and past traumatic experience. These types of studies would allow for more in-depth research on functionality of nightmares. Furthermore, it would be important to focus on the distress of nightmares on people with past traumatic experiences. This could explain other nightmare functions, whether it is impairment in fear-memory extinction process, or if it still protects the psyche. Lastly, psychological disorders should also be considered in the future, as there is already a prevalence of nightmares in the “psychiatric population” (Rek et al., 2017).

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E-Learning: Methods and Cognitive Effect: The Impact of Different Approaches of Online Education on Students' Memory and Attention

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Abstract

The pandemic forcing schools across the world to switch to online learning has undoubtedly had an effect on students. However, different schools approached this switch with different methods of teaching; the conventional-method, in which the standard teaching style is moved online, and the blended-method, in which more interactive methods are employed. The aim of the research was to study the difference in memory and attention in students who study in a conventional-method (CM) online setting as opposed to a blended-method (BM) online setting. 50 participants studying at the University of New York in Prague (CM) which cooperates with Empire State College (BM), were given the MMQ-Strategy questionnaire and MARS questionnaire to measure memory and attention, respectively. Results showed that attention was significantly affected by the teaching methods. Students under the blended method were shown to have to have the highest attention score. This implies that the blended method could be more beneficial to these students, and could reflect future considerations from universities in how to handle the switch to E-Learning.

Keywords: E-Learning, teaching methods, memory, attention, university students

1. Introduction

The educational system worldwide is one of the pandemic's main victims. It has fallen down and has been affected greatly due to the closure of schools and the complexities that followed. As a result, the feature of E-learning is on the rise and its efficiency is highly debatable. Educational institutions decided on different forms as to how to proceed with online learning; to whether maintain the same conventional structure or adapt to the situation creating new features for teaching. The aim of this paper is to focus on studying quantitatively the difference between a conventional method (CM), which consists in maintaining the same structure of face-to-face teaching in

an online setting, which means following the same schedule and duration while online, and a blended method (BM), which consists of the use of different types of teaching, such as shorter class time with the implementation of interactive activities and extra classwork, and how it affects students' memory, learning, and attention. The participants, students from partnering universities that have access to these two different types of learning structures, will be assessed on the two aforementioned levels through a questionnaire, assuming that students that partake in the BM of learning will score higher on all three variables compared to those that partake in the CM.

2. Literature Review

2.1 E-Learning Approach

The main aim of this research is to look at the different approaches that E-learning is taking at our partner universities and establish the effects that the latter have on two important cognitive elements: memory and attention by asking students to fill in a survey containing cognitive scales. In order to test our hypothesis that favours the positive effect that blended E-learning methods have, many resources have constituted the base of this research and the blueprint of the work plan. In a study conducted by Kearsley et. Al (1995), the general aspects of E-learning education were evaluated, and through a comprehensive analysis of several studies on the topic, findings show that student's satisfaction and GPA were higher, and that there was a significant development of critical thinking and problem solving. The study highlights that the communication is easier, and the high degree of interactivity between professors and students is very beneficial for the student's overall learning outcome.

2.1.1 *The Blended Method*

Aiming to better understand the effectiveness of a BM course, a research was conducted with the goal of evaluating the impact of online learning activities in the outcomes of the learning of students (Nguyen, 2017). With the analysis of quantitative data, findings show that students who engaged in the learning activities throughout the course had better results, supporting the idea that a BM is more impactful for an online environment. Furthermore, a research took a close look at the use of the video feature in BM, focusing on different types of videos and evaluating student's engagement and satisfaction (Choe et. Al, 2019). Researchers found that multimedia education can be useful and engaging, and that students prefer personal and positive evoking videos.

2.1.2 *The Conventional Method*

In response to the COVID-19 pandemic, educational institutes around the world had to shift to E-learning, and this sudden change did not allow for much planning, resulting in many classes being simply transferred to the online environment, without change in its structure. A national survey of undergraduates shows that with the rough shift to online education, students are dissatisfied with the lack of collaboration, motivation, and inclusion, and satisfaction went from 51% to 19% (Means, B., and Neisler, J., 2020). Students also expressed that the CM of E-learning is lonely and does not allow for interaction of quality, consequently affecting their learning.

2.2 Memory in E-Learning

In order to better understand what the effects of the different online learning models in students are working memory span (WM), a large-scale research was conducted (Tsianos et. Al, 2010). The findings show that personalization of techniques enhances the WM and resulted in better learning, supporting the hypothesis that BM is more beneficial for the students' academic outcome.

2.3 Attention in E-Learning

Analyzing the variable of attention is equally important to the evaluation of different styles of E-learning. A study aimed to investigate the influence of the use of videos in classes, and its effect on student's attention span (Geri, Winer, & Zaks, 2017). Through a quantitative empirical research and the use of a learning analytics approach, researchers' findings show that the use of videos is effective for the attention spam only for short lectures, and when used in longer lecturers, it can be a source of distraction rather than an interactive feature.

The mentioned studies, in general, lead to the support of the hypothesis that BM that makes use of different educational features is better for students' memory and attention, and they lead to better educational outcomes.

3. Method

3.1 Participants

50 University students from the University of New York in Prague (UNYP) and Empire State College (ESC), (15 male, 35 female), between the ages of 18-37 participated in this research. The subjects answered a questionnaire, which asked for their self-evaluation in regard to the impact of E-Learning on memory and attention. All participants submitted their informed online consent before participating in this study.

3.2 Materials

3.2.1 *Multifactorial Memory Questionnaire (MMQ)*

The original MMQ consists of 3 scales: MMQ-Satisfaction that focuses on feelings towards memory, MMQ-Ability which focuses on perception of memory ability, and MMQ-Strategy which focuses on strategies used to aid memory. Using only one section of the MMQ does not pose any problems in analysis (Baycrest, 2018). The MMQ-Strategy was used specifically because it was the most applicable to our study, as the strategies listed can be used in a variety of settings in everyday life (Troyer & Rich, 2018) including study methods, which would vary between learning styles. This variety of settings would also reflect how the difference in learning methods may affect memory strategies outside of school. Additionally, the MMQ-Strategy test is both short, and the questions are general enough that they can be applied to a variety of ages (Troyer & Rich, 2018) - therefore, age of the student would not be a confounding variable.

3.2.2 *Moss Attention Scale (MARS)*

The MARS was initially created to test attention in people who have suffered a traumatic brain injury, but it is not a requirement for the participants (MMRI, 2019). It includes basic and higher order attention-based behavioral

descriptors, each of which is rated by the participant by how well it applies to them. The MARS was used because it tests attention in the real world and daily life, so it is very applicable to what we are researching as well as applicable to our participants. Other factors for why it was chosen is that it is stated to be applicable to those from a variety of backgrounds, voiding it as a possible confounding variable, as well as its ability to be taken individually, which many attention scale questionnaires are not (MMRI, 2019).

3.3 Procedure

In our research, an online questionnaire made on Google Forms was distributed amongst UNYP and ESC students through emails and Facebook groups. The questionnaire was taken individually and unsupervised. Its data was analyzed in terms of whether they had access to either CM or the BM, then comparing the student's self-evaluation regarding the variables of memory and attention.

4. Results

A one-way between-subjects ANOVA was conducted in order to determine if any of the following teaching methods, classified into three groups, CM, BM and or both, have a significant effect on students' memory and attention. For memory scores, normality was assessed by Shapiro-Wilk test and the data was normally distributed ($p > .05$) (see Table 1). However, homogeneity of variances, as assessed by Levene's test, was violated ($p > .05$) (see Table 2). For attention scores, normality was violated ($p < .05$) (see Table 3). Homogeneity of variances was violated as well ($p < .05$) (see Table 4). There was no significant effect of any of the teaching methods on memory, $F(2, 47) = .642, p = .531$ (see Table 5).

Attention scores of students who were under the BM were the highest ($M = 85.6$), followed by CM+BM ($M = 74.1$) and finally CM ($M = 68.7$) (see Table 6) with a significant difference, $F(2, 47) = .923, p < .001, \eta^2 = .282$

(see Table 7). Tukey post-hoc analysis revealed that the mean difference between the CM and the BM (16.91) was statistically significant ($p < .001$) as well as the mean difference between the BM and both methods combined (11.46) with $p = .032$ (see Table 8).

Table 1

Normality Test (Shapiro-Wilk)-MMQ

Statistic	p
.990	.943

Table 2

Homogeneity of Variances Test (Levene's)-MMQ

F	df1	df2	p
3.44	2	47	.040

Table 3

Normality Test (Shapiro-Wilk)-MARS

Statistic	p
.977	.438

Table 4

Homogeneity of Variances Test (Levene's)-MARS

F	df1	df2	p
5.74	2	47	.006

Table 5

ANOVA Ran on MMQ Scores

	Sum of Squares	df	Mean Square	F	p
Teaching method	138	2	68.9	.642	.531
Residuals	5050	47	107.4		

Table 6

Estimated Marginal Means - Teaching method and Attention Scores

Teaching method	Mean	SE	95% Confidence Interval	
			Lower	Upper
CM	68.7	2.08	64.5	72.9
BM	85.6	3.35	78.9	92.3
Both	74.1	2.83	68.4	79.8

Table 7*ANOVA Run on Attention Scores- MARS*

	Sum of Squares	df	Mean Square	F	p	η^2
Teaching method	2070	2	1035	9.23	< .001	.282
Residuals	5272	47	112			

Table 8*Post Hoc Comparisons - Teaching Method*

Comparison						
Teaching method	Teaching method	Mean Difference	SE	df	t	Pukey
CM	- BM	-16.91	3.94	47.0	- 4.29	< .001
	- Both	-5.45	3.51	47.0	- 1.55	.276
BM	- Both	11.46	4.38	47.0	2.61	.032

Note. Comparisons are based on estimated marginal means

5. Discussion

This study aimed to examine a significant effect of teaching methods with its 3 levels: CM, BM and both on memory and attention of university students. Unfortunately, no significance was established between any of the teaching methods and memory. However, attention was found to be significantly affected by teaching methods. Specifically, students who were taking ESC courses and were under the blended method, were found to score the highest on the attention scale. All the aforementioned analysis can lead to the limitations of the study. First, the sample size was small and only consisted of 50 participants. Having small sample size increases the likelihood of having type II errors. Second, the period during which students were tested and also during which

these methods were implemented, did not exceed a period of 6 months to 1 year. Third, the violence of homogeneity of variances increases the risk of rejecting falsely the null hypothesis.

6. Conclusion

The aim of this study was to examine the effect of all the teaching methods, in its 3 levels as offered by our institution on students' memory and attention. Unfortunately, no significance was found between memory and teaching methods and many limitations faced this study. However, this doesn't limit the possibility of conducting further related studies, in hope that ours provided a framework and a solid ground to the former.

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Lullabies: Soothing Children, while Supporting Their Linguistic and Musical Development

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Abstract

The youngest generation, so-called digital natives, is mostly associated with numerous advantages, such as readily available information and limitless possibilities. Nonetheless, disadvantages such as cognitive development challenged by their parents' higher busyness are often overlooked. Caregivers play an essential role in a child's development from the very beginning of a child's life. It has been discovered that by singing lullabies to children it is possible to reinforce a child's linguistic as well as musical development. Since the cognitive development of digital natives might become impeded by higher time demands of today's fast life pace impacting their parents, this study focuses on the relationship between the parental time spent by singing lullabies to children and children's linguistic along with musical abilities assessed by school grades. Additionally, this study assessed parents' evaluation of the linguistic and musical abilities of their children. To test the hypotheses that the more and the longer (in terms of child's age) parents were singing lullabies to their children, the better will children perform both linguistically and musically, an online questionnaire was distributed to Czech and Slovak parents of children 8-12 years old. Parental responses were meticulously analyzed by using three separate between-subjects ANOVAs. The data were collected from 107 respondents. All three hypotheses were confirmed.

Keywords: lullabies, linguistic development, musical development, ICT, digital natives

1. Introduction

Although the flooding by rapidly evolving Information and Communication Technologies (ICT) typical for the transition from 20th century to 21st century brought enormous progress and facilitation of connection across the globe and almost unlimited access to information, it also deepened some pitfalls that have remained rather hidden. Among these pitfalls reside shorter attention span (and therefore less effective learning abilities) or inferior vocabulary development in children (Bittman et al., 2012; Sweet et al., 2019). Child development troubled by the ubiquity of ICT might call upon the return to simple time-

tested methods of assisting the development of children's cognition, such as singing them lullabies. A lullaby represents one of the first introductions to music, language, poeticism, and cultural and ethnic background. Therefore, lullabies can help with improvement in linguistic and musical skills (Gurak, 2017). Out of all human senses, hearing is the most developed one before birth. A fetus responds to sound from about 18 weeks of intrauterine development (Pathak & Mishra, 2017). Thus, singing lullabies can be one of the first things parents can do to benefit their child's cognitive development, even while the baby is still in the womb.

Therefore, the three hypotheses have been formed to explore whether there is a significant difference between the musical and linguistic abilities of children who were exposed to various frequencies, forms of lullabies' reproduction, and different child's ages until what lullabies were sung or played to them.

2. Literature review

2.1 Linguistic and Musical Development in

Children

The auditory system begins to form around the 18th week of intrauterine development. Around week 20 a fetus can react to noises from the uterus but also to sounds from the outside (Pathak & Mishra, 2017). Since hearing is one of the first best-developed senses after birth, it becomes a crucial tool for caregiver-child communication and bonding (Cirelli et al., 2016). Speech and music are interdependent in children's development as they develop correspondingly. On top of that, brain areas for speech and music development have identical roots. Children themselves start to produce first sounds in the form of cooing or other rhythmical babbling with changing intonation. This corresponds to similarities between speech and music that link the rhythm of music with the rhythm of language and intonation in language with musical melody (Hayoung, 2011). Nolen-Hoeksma et al. (2018) stress the infants' utilization of hearing as a central leash for gaining information about their environment. It is assumed that singing evolved even before speech. This assumption can be supported by findings in Conrad et al. (2011) who discovered that infants do prefer the tempo in play songs and that they understand the context and different purposes of play songs and lullabies even before they can comprehend the meaning of the words sung in them.

2.2 Lullabies

Among other musical repertoire, lullabies are the first songs introduced to infants. Lullabies are sung all over the

world and across various cultures. Besides that, they are not restricted in any level of education nor any socioeconomic status (Mullen, 2017). A study done by Watts et al. (2016) explores Kenyan mothers from low-income families and their children's development. They discovered that Kenyan mothers often use lullabies and other songs to promote psychosocial stimulation and development in their children. Infants prefer their mothers' high-pitched voices known as "motherese" which is one of the pillars in the imaginary bridge between parents and their child. Lullabies can suit as an emotional tool for mothers to introduce their babies to their native language. Besides, Papatzikis (2017) identified lullabies also as a tool for behavioral regulation and the enhancement of learning and memory. It is due to the activation of the auditory cortex through the brainstem. For scientific context- the brainstem, which is a brain area interconnected to the most vital bodily functions such as the heartbeat and circulation, is also interconnected with sound perception as it serves the central auditory pathways. These pathways extend from the cochlear nucleus to the auditory cortex (Papatzikis, 2017). The structures of the lullabies in terms of tunes and lyrics are simple enough and have an emotional wave impactful enough to activate the brain stem response to sound. In terms of the development of musicality, according to Merkrow (2012), all children are born with musical potential. Concerning children possessing musical aptitude, it is suggested that infants possess a very rich auditory perception and are able to recognize subtle differences in pitch, rhythm, and melodic contour –the sequence of motions between the notes of a melody. Merkrow (2012) describes the first year of life as detrimental to musical exposure, as during this first year the brain's malleability is greatly influenced by the environment. By exposing infants to lullabies and enhancing musical exposure as they grow older- with the music possessing more complex patterns, children can eventually grow into their born musicality.

2.3 Generation of Digital Natives

The generation that grows up without remembering times with no internet connection and households filled with ICT is also called “digital natives”. Even though this generation is generally described as open-minded and skilled in multitasking, it has to face other challenges that other generations were saved from. Mullen (2017) discovered that only 46.4 % of kindergarten children from Canada met the standard criteria for suitable development in five domains of the Early Developmental Instrument, which covers language and cognitive development. These findings correspond with results researched by Bittman et al. (2012) which state that children from generation Z have inferior educational outcomes and poorer development of vocabulary as they spent more time watching TV or playing PC games than reading. The newest generation Alpha and their connection with busier and busier parents has not been thoroughly studied yet. However, it can be assumed that with the increasing pace of life and work demands at the one side, and ICT at hand at the other side children will spend even more time in the companion of screens more than with their parents possibly singing and reading to them. Human contact can be easily replaced by recorded versions of fairy tales as well as lullabies.

As the linguistic and musical abilities in correlation with exposing children to lullabies either sung or played on record have not been thoroughly researched in today's children from generation Alpha, three hypotheses were formed as follows – 1. The children of parents who sang the lullabies will perform better linguistically and musically, than the children of parents who played recorded lullabies to the children or did not sing to their children at all, 2. The more often the parents sang the lullabies to their children, the better the linguistic and musical performance will be, and lastly 3. The longer (in terms of child's age) the parents sang the lullabies to their

children, the better the linguistic and musical performance will be.

3. Methodology

3.1 Participants

Participants consisted of 107 parents of children 8/12 of age and all genders. The age range of children was chosen intentionally so that children would be old enough to be graded at school from two components of language (grammar and writing style), yet at the same time, they would be young enough to still carry the main influence from home and not the institution. That would be the optimal age when evaluating the abilities that were in all likelihood acquired from caregivers and not given more by years of studying. Respondents for this study were from the Czech Republic and Slovakia.

3.2 Materials

For this study, the researchers created a non-standardized questionnaire, which was later used during the data collection. The non-standardized survey consisted of 10 items, that explored the effect of lullabies on the musical and linguistic development of children. The 10 questions were chosen so that respondents could be divided into three groups – parents who sung, parents who did not sing, and parents who played recorded lullabies. The second and third questions further divided respondents according to the frequency of singing lullabies to children, and the age of children up to which lullabies were sung/played to them. Furthermore, to measure the linguistic and musical development of participants' children, questions were included about children's grades in second grade in Czech or Slovak language (divided into writing and grammar grade) and music. To broaden the perspective of children's evaluation a section was added of parental assessment of children's spoken and musical expression, in addition to interest in music.

3.3 Procedure

The questionnaire was constructed via google forms and then was distributed online, because of the regulations and safety measures that were in place during the COVID-19 pandemic. Due to the sample consisting of Czech and Slovak parents, the questionnaire was created in the Czech language. The survey consisted of 10 questions, which took approximately 10 minutes to answer. The collection of data from respondents took 6 weeks in total and during this period the google forms were available for participants online. To secure the validity of data and to obtain a random sample of participants, the respondents were chosen regardless of their occupation, gender, age of parents, or socioeconomic status. Subjects submitted their informed consent online, before filling the questionnaire. The collected data were thoroughly analyzed.

3.4 Data Analysis

There were conducted six separate one-way between-subjects Analyses of Variances to explore whether the frequency of singing/playing of lullabies, the form of delivery of lullabies (sung, recorded), and age up to what were lullabies sung or played to children as independent variables affected dependent variables consisting of linguistic and musical abilities of children.

4. Results

To confirm or reject the three hypotheses the responses from 107 respondents were analyzed by six separate tests and evaluated individually.

4.1 Linguistic Abilities and Singing/Playing of Lullabies

To test half of the first hypothesis respondents were divided into three groups according to their responses in the questionnaire (sung, played recorded lullabies, or did not sing to children). Data were not normally distributed for each group, as assessed by the Shapiro-Wilk test ($p < .05$) and there was homogeneity of variances, according to

Levene's test of homogeneity of variances ($p > .05$) (see Table 1 and 2). The results revealed that signing of lullabies had a significant effect on linguistic abilities $F(2, 104) = 4.79, p = .01, \eta^2 = .08$ (see Table 5). Moreover, the children whom lullabies were sung had the highest linguistic abilities expressed in percentual grades ($M = 91.50$) compared to those children whom were lullabies played ($M = 87.42$) and those whom lullabies were not sung nor played ($M = 83.12$) (see Table 4). Thus, half of the first hypothesis concerning linguistic abilities was confirmed.

4.2 Linguistic Abilities and Frequency of Singing/Playing

To examine a part of the second hypothesis respondents were divided into four groups according to their responses in the questionnaire (every day, 5-3x a week, 2-1x a week, and did not sing). Data were not normally distributed for each group, as assessed by Shapiro-Wilk test ($p < .05$) and there was no homogeneity of variances, according to Levene's test of homogeneity of variances ($p < .05$) thus, the Welch's adjustment was used (see Table 1 and 3). The results showed that the frequency of singing or playing lullabies to children had a statistically significant effect on linguistic abilities $F(3, 103) = 6.12, p < .001, \eta^2 = .15$ (see Table 7). Furthermore, the more frequently were lullabies sung or played to children the better were their linguistic abilities, for marginal means see Table 6. Thus, the part of the second hypothesis was confirmed.

4.3 Linguistic Abilities and Age until What Were Lullabies Sung or Played to Children

To test the first half of the third hypothesis respondents were divided into four groups according to the ranks of ages of children until what were lullabies sung or played to them (until 6 and more years of child's age, until 4 years of child's age, until 2 years of child's age, and did not sing). Data were not normally distributed for each group, as assessed by the Shapiro-Wilk test ($p < .05$) and there was

homogeneity of variances, according to Levene's test of homogeneity of variances ($p > .05$) (see Table 1 and 2). The results revealed that the length (in terms of child's age) of singing or playing lullabies had a statistically significant effect on linguistic abilities $F(3, 103) = 2.86, p = .041, \eta^2 = .08$ (see Table 9). Additionally, the longer (in terms of child's age) were lullabies sung or played to children the better were their linguistic abilities, for marginal means see Table 8. Thus, the third hypothesis was confirmed.

4.4 Musical Abilities and Singing/Playing of

Lullabies

To answer the second half of the first hypothesis concerning the musical abilities, the respondents were divided into three groups according to their answer indicated in the questionnaire (sung, played recorded lullabies, or did not sing to children). Data were not normally distributed for each group, as assessed by Shapiro-Wilk test ($p < .05$) and there was no homogeneity of variances, according to Levene's test of homogeneity of variances ($p < .05$) thus, the Welch's adjustment was used (see Table 1 and 3). The effect of singing, playing, or not singing lullabies at all on musical abilities had resulted in the highest musical abilities expressed in the average of percentual grades having those children whose parents sung the lullabies ($M = 92.33$). When the parents played the recorded lullabies, the average of percentual grades was lower ($M = 85.16$) and the lowest average of percentual grades had children of the parents who were not singing, neither playing ($M = 74.37$) (see Table 10). The differences between groups were significant $F(2, 104) = 22.86, p < .001, \eta^2 = .31$ (see Table 11).

4.5 Musical Abilities and Frequency of Singing

Playing of Lullabies

To confirm or reject the remaining part of the second hypothesis respondents were divided into four groups according to their responses in the questionnaire (every

day, 5-3x a week, 2-1x a week, and did not sing). Data were not normally distributed for each group, as assessed by Shapiro-Wilk test ($p < .05$) and there was no homogeneity of variances, according to Levene's test of homogeneity of variances ($p < .05$) thus, the Welch's adjustment was used (see Table 1 and 3). Results revealed that when the parents were singing every day ($M = 94.17$) the average of percentual grades of musical abilities was the highest. When they were singing 5-3x a week ($M = 91.03$), when 2-1x a week ($M = 86.39$), and when they were not singing at all the average of percentual grades of musical abilities had the lowest value ($M = 75.56$) (see Table 12). The difference among groups was significant $F(3, 103) = 13.7, p < .001, \eta^2 = .29$ (see Table 13).

4.6 Musical Abilities and Age until What Were

Lullabies Sung or Played to Children

To inspect the second half of the third hypothesis, respondents were divided into four groups according to the ranks of ages of children until what were lullabies sung or played to them (until 6 and more years of child's age, until 4 years of child's age, until 2 years of child's age, and did not sing). Data were not normally distributed for each group, as assessed by the Shapiro-Wilk test ($p < .05$) and there was homogeneity of variances, according to Levene's test of homogeneity of variances ($p > .05$) (see Table 1 and 2). The analysis showed that the average of percentual grades of musical abilities was the highest for children, who were listening to the lullabies until 6 years and longer ($M = 94.17$). For the rest of the groups according to age ranks the average of percentual grades was gradually declining as follow - until 4 years of age ($M = 90.81$), until 2 years of age ($M = 87.67$), and the lowest average of percentual grades of musical abilities had children who were not introduced to lullabies at all ($M = 74$) (see Table 14). The differences in groups were significant $F(3, 103) = 12.02, p < .001, \eta^2 = .26$ (see Table 15).

By dividing the three hypotheses into two separate sections according to either linguistic or musical abilities and their sequential analyses it was found that the effect of all independent variables on both dependent variables separately was in all cases statistically significant therefore the whole three hypotheses were confirmed.

Table 1

Normality Test (Shapiro-Wilk)

Statistic	p
.91	<.001
.94	<.001
.93	<.001
.94	<.001
.97	.026
.97	.026

Table 2

Homogeneity of Variances Test (Levene's)

F	df1	df2	p
.91	2	104	.407
.62	3	103	.601
2.27	3	103	.085

Table 3

One-Way ANOVA (Welch's)

	F	df1	df2	p
Linguistic Abilities	7.27	3	51.00	<.001
Musical Abilities	15.96	2	35.18	<.001
Musical Abilities	10.21	3	48.57	<.001

Table 4

Estimated Marginal Means for the Effect of Singing of Lullabies on Linguistic Abilities

Singing	Mean	SE	95% Confidence Interval	
			Lower	Upper
Yes	91.50	1.32	88.88	94.12
Recorded lullabies	87.42	1.84	83.77	91.07
No	83.12	2.56	78.05	88.20

Table 5

ANOVA Showing the Effect of Singing of Lullabies on Linguistic Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Singing	1004.24	2	502.12	4.79	.010	.08
Residuals	10902.30	104	104.83			

Table 6

Estimated Marginal Means for the Effect of Frequency of Singing of Lullabies on Linguistic Abilities

Frequency	Mean	SE	95% Confidence Interval	
			Lower	Upper
Every day	93.33	2.02	89.32	97.34
5-3x a week	92.76	1.84	89.11	96.41
2-1x a week	86.39	1.65	83.11	89.66
Did not sing	82.78	2.33	78.15	87.41

Table 7

ANOVA Showing the Effect of Frequency of Singing of Lullabies on Linguistic Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Frequency	1802.23	3	600.74	6.12	<.001	.15
Residuals	10104.31	103	98.10			

Table 8

Estimated Marginal Means for the Effect of Child' Age Until When Lullabies Were Sung on Linguistic Abilities

Until What Age	95% Confidence Interval			
	Mean	SE	Lower	Upper
until 6 and more years of child's age	93.33	2.98	87.42	99.25
until 4 years of child's age	90.54	1.70	87.17	93.91
until 2 years of child's age	88.84	1.58	85.71	91.96
Did not sing	82.67	2.67	77.38	87.96

Table 9

ANOVA Showing the Effect of Child' Age Until When Lullabies Were Sung on Linguistic Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Until What Age	915.49	3	305.16	2.86	.041	.08
Residuals	10991.05	103	106.71			

Table 10

Estimated Marginal Means for the Effect of Singing of Lullabies on Musical Abilities

Singing	95% Confidence Interval			
	Mean	SE	Lower	Upper
Yes	92.33	1.26	89.84	94.82
Recorded lullabies	85.16	1.75	81.70	88.63
No	74.37	2.43	69.55	79.20

Table 11

ANOVA Showing the Effect of Singing of Lullabies on Musical Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Singing	4326.95	2	2163.47	22.86	<.001	.31
Residuals	9841.28	104	94.63			

Table 12

Estimated Marginal Means for the Effect of Frequency of Signing of Lullabies on Musical Abilities

Frequency	95% Confidence Interval			
	Mean	SE	Lower	Upper
Every day	94.17	2.02	90.15	98.18
5-3x a week	91.03	1.84	87.38	94.69
2-1x a week	86.39	1.65	83.11	89.67
Did not sing	75.56	2.34	70.92	80.19

Table 13

ANOVA Showing the Effect of Frequency of Signing of Lullabies on Musical Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Frequency	4040.93	3	1346.98	13.70	<.001	.29
Residuals	10127.30	103	98.32			

Table 14

Estimated Marginal Means for the Effect of Child' Age Until When Lullabies Were Sung on Musical Abilities

Until What Age	95% Confidence Interval			
	Mean	SE	Lower	Upper
until 6 and more years of child's age	94.17	2.91	88.39	99.95
until 4 years of child's age	90.81	1.66	87.52	94.10
until 2 years of child's age	87.67	1.54	84.62	90.73
Did not sing	74.00	2.61	68.83	79.17

Table 15

ANOVA Showing the Effect of Child' Age Until When Lullabies Were Sung on Musical Abilities

	Sum of Squares	df	Mean Square	F	p	η^2
Until What Age	3673.44	3	1224.48	12.02	<.001	.26
Residuals	10494.78	103	101.89			

5. Discussion

The study explored the influence that singing or playing recorded lullabies to children possibly had on children's linguistic and musical development. The analysis of the data collected from 107 respondents indicates that the more in terms of both frequencies per week and age until what lullabies were sung or played to the children the better was their linguistic and musical development assessed by an average of grades in percentage as well as parental evaluation of children's abilities. The results confirmed all three established hypotheses that were based on the previous literature review of the topic. The confirmed hypothesis that children whom were lullabies sung personally by their caregivers had the highest averages of grades in both musical and linguistic abilities and correspond to the findings of Bittman et al. (2012) who warns about lower educational outcomes in children from generation Z for whom the personal contact often becomes replaced by TVs or playing recordings. However, for children, especially newborns, is the establishment of a firm bond and appropriate sensory and cognitive stimulation by their caregivers essential (Merkow, 2012; Nolen-Hoeksma et al., 2018; Papatzikis, 2017). The results go in line with other studies stressing that musical and linguistic development are interconnected processes that need to be supported as early as possible because the infants' environment and outer stimuli are the only sources that can enhance the naturally inborn musical and linguistic potential in every one of them (Cirelli et al, 2016; Hayoung, 2011; Merkow, 2012; Papatzikis, 2017). Findings of this study suggest that time that parents will invest into their children, even in simplest ways such as singing them lullabies, can be returned to them in the form of skilled child utilizing its developmental potential onto its maximum. Such realization can serve as a reminder for parents of the generations surrounded by ICTs of the importance of personal contact, closeness, and efficacy of the time-tested tools such as lullabies.

Even though all three hypotheses were confirmed, and the results are following previous studies done in this field the research has its limitations. Among these is a fact that the school grades of children were used as an indicator of their musical and linguistic development however school grades alone cannot be seen as the most objective tool for assessment of any development. Moreover, the vast majority of children in the second grade of elementary schools in the Czech Republic and Slovakia get the best grade from Music only for the sake of their effort no matter their abilities. That was found as well in our data where each child of all participants (100% out of 107 respondents) had an A from Music. More objective evaluation can be probably given by parents of a child however there is on the other hand a significant influence of parental personality and standards.

6. Conclusion

This research was conducted to explore the effect of lullabies on the musical and linguistic development of children. Although various studies considering the topic had been done previously, no studies similar to this research design were found. Many of those studies focused on the development of hearing in a fetus or musical and linguistic potential in children however, neither of the studies discovered by us attempted to directly analyze the use of lullabies and later developmental level of children exposed to them. It is needed to emphasize that the assessment of children's abilities was not optimal, thus this study could serve as an impulse for further research, especially considering the tendency of the modern age to let ICTs rearing children.

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