Thomas Hunt
Lee Ming Tan *Editors*

Applied Psychology Readings

Selected Papers from the Singapore Conference on Applied Psychology 2021

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Preface

The 2021 Singapore Conference on Applied Psychology, organised by East Asia Research and supported by Singapore University of Technology and Design and the University of Derby, was held virtually 9–10 December 2021. Researchers and practitioners from many fields of psychology research and practice presented on recent innovations, trends, concerns, practical challenges, and the solutions adopted in the field of Applied Psychology, with a special focus on psychological well-being. Presentations were given by academics and practitioners in over ten countries, and keynote presentations were given by Dr. Carrie Childs from the University of Derby, who presented on 'Constructing the sex addict', along with Dr. Yow Wei Quin from Singapore University of Technology and Design, who presented on 'COVID-19 lockdown measures: Impact on older adults with dementia and their caregivers in Singapore'.

This book includes seven papers submitted and accepted for special publication following a peer-review process supported by academics at the University of Derby, co-ordinated by Dr. Thomas Hunt. The papers selected for publication cover an exciting and diverse range of empirical studies and discussions in the field of applied psychology. This includes topics of psychological well-being in students; emotion regulation; financial resilience; problematic online gaming; psychological effects of facial exercises; teachers' perceptions of student misbehaviour; and the empowerment of millennials at work.

Yours sincerely,

Thomas Hunt
SCAP 2021 Conference Chair

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East Asia Research (EAR)

Established in Singapore in 2015, East Asia Research (EAR) envisions to be the gateway to improving lives and enhancing productivity in Asia through promoting cross-geographical exchange of ideas and knowledge in various faculties. This will be achieved through the dissemination of knowledge from the Asia-focused research conferences and publications by EAR.

EAR academic conferences provide a meaningful platform for researchers, post-graduates, academicians, and industry practitioners to share unique insights and drive innovation. This is a great opportunity for expanding contact networks beyond a singular field and kick-starting a strategic collaboration. Such partnership can bridge the resources and expertise of multiple disciplines to spearhead pioneer movements, giving rise to breakthroughs in long-standing issues.

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About the Editors

Assoc. Prof. Dr. Thomas Hunt is an Assoc. Professor in the School of Psychology at the University of Derby in the UK. As an internationally recognised researcher in the field of mathematics anxiety, he has published several self-report measures and conducted a range of studies investigating the mechanisms that underpin the relationship between mathematics anxiety and performance. His recent work has involved studying mathematics anxiety in an applied way, including drug dosage calculation anxiety in nursing students and statistics anxiety in students. He regularly works with a range of stakeholders to provide professional development workshops on the topic of mathematics anxiety, including strategies to reduce it.

Mr. Lee Ming Tan is the founder of East Asia Research, and he obtained his Master of Applied Finance from The University of Adelaide. He is deeply interested in how humans function and react with each other. An insight into how people's minds think and how they work together is invaluable in just about every field. Outside of work, he enjoys outdoor activities and the occasional computer game.

Psychological Well-Being of International Students Aged 15–17

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Abstract. This study involved 40 international high school students aged 15–17 from different regions of the world, completing their high school education in Russia, at a special school for the children of diplomats and highly-paid contract employees in Moscow. We studied: ideas about one's psychological well-being with the help of a short essay; school-related problems with the help of the Student Adjustment Problems Inventory (SAPI); school anxiety with the help of the School Anxiety Questionnaire by Beeman N. Phillips (SAQ). The ideas about one's psychological well-being were calculated using content analysis and translated into percentages. The assessment of school problems, as well as school anxiety, was calculated using the keys of questionnaires and numerical results were translated into percentages. The study is a pilot and descriptive. No statistical criteria were applied. It was found that, for this sample, ideas about their psychological well-being were linked to achievement of success in life, study and self-control. School problems related to perfectionism, parental expectations and multipotentiality. Their situational school anxiety is related to problems with teachers, frustration at the need for achievement and social stress. However, general anxiety in the vast majority of them is not characterized by high values. All this allows us to characterize this sample as being ambitious but at risk due to overstretch. The majority of high school students do not appear to be characterized by high values adults and peers, however, need to be investigated further.

Keywords: Ideas of own psychological well-being · School-related problems · School anxiety · High school students · Foreigners

1 Introduction

Every nation has ideas about its well-being. For example, the Russian proverb "A fish searches where it is deeper, and a man – where it is better." ("Rybaischetgdeglubje, a chelovek – gdeluchshe"), like the Vietnamese – "In a pond - a big fish" ("Trong một cáiao - một con cál´ơn") and English – "Acorns were good till bread was found". For most people, subjective well-being is determined by ideas which are present in their social

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consciousness. Differences in the understanding of what constitutes psychological well-being can cause many problems for people who, because of their circumstances, live in a country with a different history, culture and economic socio-economic systems. Ideas of well-being of one or other people or nations appear and develop under the influence of their surrounding historical, cultural and social reality.

At the same time, the process of globalization emanating from Old and New World countries has an impact on people's perceptions of their well-being from other regions. However, it is important to keep in mind that the Western standard of well-being as satisfaction with life and striving for it does not coincide, for example, with South-eastern traditions. In particular, in the Southeastern tradition, happiness and well-being are the achievement of a balance between various trends in life (neutrality-suffering, dependence-independence, caring for others - receiving support) (Valieva 2018). In the West, autonomy, as a desire for individualism and independence, is a measure of psychological well-being. In the East, autonomy is rather an expression of the ability to use willpower to support personal goals and actions. In non-Western countries, social control does not always indicate a decrease in the well-being of the subject (Shamionov 2016). But while a nation's culture and mindset influence perceptions of subjective well-being, it is also the case that assessments of satisfaction with life and happiness are independent of public opinion and benchmarks (Dzhidar'yan 2013). For example, there are studies indicating that psychological well-being is linked to perceptions of what is good for a person's identity. For example, there is a link between features of psychological well-being and an individual's environmental performance (Binder et al. 2020), in particular personal growth, as one aspect of eudemonic well-being, is closely related to features of connectedness to nature (Pritchard et al. 2019). In turn, eudemonic motives are associated with increased satisfaction with life, positivity and increased well-being, while hedonic motives are associated with satisfaction with life, negativity and decreased well-being (Zeng and Chen 2020).

The psychological well-being of adolescents aged 15–17 is of particular research interest because of important age-related developmental tasks: personal development and the acquisition of a personal and psychosexual identity, the independent choice of a future profession in accordance with chosen life goals and the development of a readiness for further life self-determination based on developed value conceptions, responsibility, and independence.

Psychological and social factors, among others, resilience, fear of failure and sense of belonging (Govorova et al. 2020), and teacher stress can have negative consequences for students (Ramberg et al. 2020). Research shows that a decrease or increase in students' psychological well-being is related to both their country of residence and their family's income level. There is also evidence that a slight increase in mental well-being is associated with an increase in workload due to school tasks among students from high-income countries. (Cosma et al. 2020).

The features listed apply to pupils who are educated in their home country, however, it is of interest to know what the psychological well-being and judgement of foreigners who receive their education in high school in another country is. This raises research questions:

1. What ideas about psychological well-being are the most important for high school students?
2. Which school-related problems do high school students consider most significant for them?
3. How severe is their anxiety?

The aim of the survey was to obtain data on what constitutes psychological well-being for international students, what adaptation problems are significant for them and what is their anxiety level. These are objective indicators of psychological well-being (Berger et al. 2020), (Chan 2003), (Misero and Hawadi 2012).

2 Materials and Methods

Study Design. The design was a cross-sectional questionnaire survey. The study presented below was conducted in spring 2019 with high school students. A survey method was used to answer the research questions and standardized techniques and one projective technique were used. The study was conducted face-to-face, using paper forms. The data was processed using percentile counting and content analysis, followed by assigning a rank to the semantic units highlighted.

The Methodology of Study. The high school students were asked the question: "*What constitutes my mental well-being?"*, it was a free-form essay to indicate what their ideas were about their own psychological well-being. Content and qualitative analysis of the results was performed. Then the results were mathematically processed by calculating percentages. *The Student Adjustment Problems Inventory* (SAPI) (Chan 2003; Misero and Hawadi 2012) contains 24 statements (4 for each of the school adjustment problems: multipotentiality, perfectionism, inflated parental expectations, emotional overexcitability, inappropriateness of the curriculum and difficulties in interpersonal relationships) which students have to rate on a five-point scale from "not at all suitable for me" - (1 score) to "totally suitable" - (5 scores). Analysis of the results is made by the frequency of problem choices: 1–2 - minimum score, 3 - average score, 4–5 - maximum score. *The School Anxiety Questionnaire* (SAQ) by Beeman N. Phillips (Phillips 1978) was used to determine the general level and partial characteristics of anxiety.

Research Procedure. The survey was agreed upon by the school administration. Those high school students who were willing to participate, and whose parents agreed to be tested in advance, were instructed to create ciphers for their data, which ensured both anonymity and the ability to report results individually. In the classroom, respondents were instructed to fill in the questionnaires verbally and in writing; they had the opportunity to ask follow-up questions. Interview time was limited to the duration of one lesson. Respondents were made aware of the true aims of the study and were informed of the timing of the results, both group and individual. They were also offered further counselling on the test results. At the end of the survey, a debriefing session was held with those who wished to participate, to reduce the risk of psychological distress from the psychological survey.

The Sample of the Study. The study was conducted in the city of Moscow in a bilingual International School. This sample is not typical of foreigners living in Russia, as it is temporarily attended by children of diplomats or parents working under contract (India, Vietnam, USA, Spain, France, Argentina, etc.). It is important to note that this school is attended by children whose parents have high expectations of them. The living conditions of these students are unusual: for example, foreign students without parents or chaperones, hardly ever go outdoors and take private transport to school. The families of these students are of middle and upper-middle social status. Forty schoolchildren in grades 10–11 participated in the survey (average age - 16.8 years).

3 Results

The aim of the survey was to identify the characteristics of international high school students' ideas of their own psychological well-being, the school problems that are most significant for them and their level of anxiety. It was assumed that all factors were in one way or another related to the main task that high school students in this sample were dealing with - adapting to their changed living conditions and new demands.

3.1 High School Students' Ideas about their Own Psychological Well-Being

The ideas concerning high school students' own perception of their psychological well-being were studied by the projective method - an essay, "What constitutes my mental wellbeing?". Adolescents wrote a few sentences about their opinion of their own well-being. According to the rules of content analysis processing (Janda et al. 2019; Lemaire and Desus 2001; Goodwin 1999), we highlighted where high school students mentioned their psychological well-being. There were 171 units in total. After analyzing the content of these units, we have identified seven thematic groups. The number of units in each of the thematic groups were ranked, that is, the objects were ordered according to the degree of decrease in their number (from more to less). The results are presented in Table 1.

Pupils were more concerned with external circumstances, success, and the ability to keep things under control. The foreign students in practically all the essays mentioned their psychological internal stability and the achievement of goals as being the main thing for them. It is important to note that 20% of the foreign students were unable to state what psychological well-being meant to them, and 5% refused to participate in the survey. This may be due to the fact that students perceived the situation as not being entirely safe for them.

3.2 School-Related Problems of High School Students

School-related problems of high school students were researched with the Student Adjustment Problems Inventory (SAPI). The responses about the importance of certain school problems for high school students were converted into percentages. The results are presented in a Table 2.

Table 1. Contents of ideas about well-being among high school students

Thematic groups	The frequency they were mentioned	Ranks
Success in life, achieving goals	36	I
Success at school	34	II
Ability to moderate & control emotions	27	III
Good mood	23	IV
Mental health	19	V
Confidence	17	VI
Self-control	15	VII
Sum	171	

Table 2. Results of descriptive variables of school problems among high school students

Descriptive Variables				
	N	Min	Max	MSD
Perfectionism	40	29	83	54,95 ± 10,436
Problems of parental expectations	40	37	69	49,93 ± 7,481
Multipotentiality	40	18	68	48,87 ± 10,234
Intensity of involvement	40	36	73	58,33 ± 9,715
Problems of unstimulating school work	40	33	62	56,63 ± 9,981
Weaknesses in interpersonal relationships	40	15	59	47,55 ± 13,926
N valid	40			

A comparison of frequency of cases among foreign high school students, where all items of the same problem got minimum points, average points or maximum points, showed that problems of perfectionism proved to be the most serious for high school students, problems of parental expectations and multipotentiality got the highest mark of them and the intensity of involvement got the highest mark for high school students. The problems of unstimulating school work and weaknesses in interpersonal relationships were less worrying for high school students respectively.

3.3 School Anxiety of High School Student's

School anxiety of high school students was researched by the School Anxiety Questionnaire of Beeman N. Phillips (SAQ). According to the processing requirements (Greben' 2007) for this test, it is necessary to count the number. There are no coincidences according to the statements for each of the 8 factors characterizing anxiety. The level of anxiety is defined as follows: if the number of matches with statements is less than 50%, this means low anxiety; if it is more than 75% of the total number of test questions, it is

about high anxiety. We counted the number of high school students who gave answers that can be attributed to low or high anxiety. We calculated their ratio as a percentage. The results are shown on a histogram (Fig. 1).

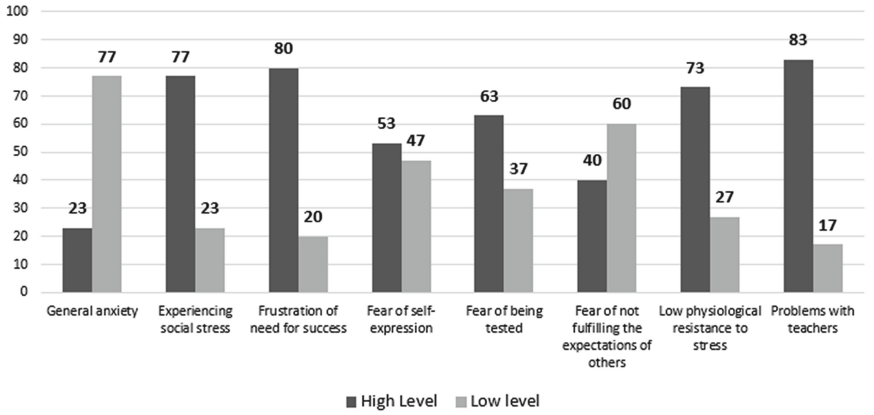

Fig. 1. Percentage ratio (%) of high and low levels according to SAQ scales among high school students

High levels on the scale of general school anxiety, a general emotional state associated with various forms of inclusion in school life, were found in 23% of high school students. The experience of social stress, the emotional state of the pupil against the background of which his social contacts (first of all, with his peers) are developed in 23% of high school pupils. Frustration at the need to achieve success - an unfavorable mental background that does not allow the development of their needs for success, achievement of high results, etc. was in 20% of high school students. Fear of self-expression - the negative emotional experience of situations that require self-disclosure, presenting oneself to others, and demonstrating one's abilities was in 47% of high school pupils. Fear of being tested - negative attitudes and anxiety when faced with (especially - public) examination of knowledge, achievements and abilities for 37% of older pupils. Fear of not meeting the expectations of others - a focus on the importance of others in assessing their results, actions, and thoughts, anxiety about the assessments given to others, anticipation of negative evaluations in 60% of high school students. Low physiological resistance to stress - peculiarities of psychophysiological organization that reduce a child's adaptability to stressogenic situations, increasing the probability of an inadequate, destructive response to an environmental anxiety factor in 27% of high school students. Problems and fears in relationships with teachers - a general negative emotional background to relationships with adults at school, decreasing the success of a child's learning in 17% of foreign students.

4 Discussion

High school students associate their psychological well-being with their success in life and in achieving their goals. Their success in school, and their psychological well-being are also related to having a good mood and being able to contain and control their emotions and themselves, to being mentally healthy and confident. All of these characteristics of psychological well-being are related to the need for achievement, high self-control and positivity. At the same time, they perceive their own perfectionism, parental expectations, multipotentiality and intensity of involvement in the environment as the most difficult problems in adapting to school life. They are not bothered by uninteresting activities and undeveloped interpersonal relationships. These results may indicate the complexity and high level of demands placed on high school students and the high level of personal responsibility for the outcome.

But, in spite of all these conditions and challenges, one of the most significant results of this study is that the general anxiety in high school students of this sample is not at a very high level: 23% have significant general anxiety. At the same time, this sample is characterized by high anxiety about problems with teachers, frustration at the need for achievement, the fact that high school students experience social stress and at the same time have low physiological resilience to stress. The concern is that more than half of high school students have a fear of testing their knowledge (63%) as well as expressing themselves (53%), while they are not very concerned about not conforming to the expectations of others. The influence of the role of the teacher, before whom they are afraid, also needs further study. It is important to understand why they are afraid of the teacher. What is the reason for this fear? Is this due to the fact that the student's success depends on the teacher, since the teacher checks the students' knowledge. The teacher can also influence other achievements of students. But, it is possible that the teacher has nothing to do with it, and it is all about the perfectionism of high school students. But this conclusion needs statistical verification, for example, using correlation analysis. The role of the teacher, before whom they are afraid, needs further study, but this may be important for them, since in many ways the personal achievements of each student depend on the teacher, which may, in particular, manifest itself in the verification of their knowledge and their own activities.

The results showed that the high school students feel strong pressure from external conditions - fears: not meeting the expectations of others - 60%, self-expression - 47% of students, being tested - 37% of high school students. In the future, we must understand how this is related to other indicators - perfectionism and weaknesses in interpersonal relationships. So far, we can only assume that the results obtained are associated with the students' experience of certain internal psychological processes, possibly associated with an internal crisis.

This is aggravated by the fact that the overwhelming majority of senior schoolchildren showed high SAQ scores on the scales: problems with teachers (83%), frustration at the need for success (80%), which may indicate problems with school implementation. High scores on the experience of social stress (77%) and low physiological resistance to stress (73%) scales characterize, on one hand, pressure from the environment, and on the other, insufficient ability to withstand unfavorable environmental conditions.

In any case, complex, stressful stress conditions during learning do not lead to self-realization of schoolchildren in school, they cannot become fully successful students. Moreover, this negative experience can carry over into their future academic and social sphere.

The findings make one wonder about the special efforts on the part of adults to help these adolescents. The findings support the idea that high school students should be provided with psychological support to prevent risky behavior and maintain their psychological well-being (Walsh et al. 2020).

Overall, this sample is characterized by a focus on high achievement, a senior orientation and individualism. It is likely that a focus on adapting to the new environment prevents the development of general heightened anxiety, although about a quarter of high school students need psychological support.

The revealed features can be clarified by comparing local Russian high school students with foreign high school students who finish their education in Russia, but who are not the children of high-ranking and wealthy parents. The data obtained can also be supplemented by conducting a personality questionnaire, in particular, to identify the peculiarities of the identity and commitment of high school students' families and themselves to traditional national values; the influence of stress factors and the psychological resilience of high school students need further study.

We are aware of the limitations of this study and will be happy to carry out such a study in the future on a wider and more diverse sample and compare the results obtained, as well as deepen the existing knowledge about our respondents by applying various statistical procedures.

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Building Coherence and Increasing Emotion Regulation Flexibility Towards Resilience: An Experimental Study in Singapore

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Abstract. Although numerous agencies in Singapore have recently taken active steps in promoting the importance of emotion regulation and resilience building, there is a paucity of publication on such intervention programs. The purpose of this quantitative experimental study, the first in Singapore, was to examine the effectiveness of the HeartMath System (HMS). Thirty-four healthy participants from all walks of life in Singapore participated and were randomly assigned to the intervention group and the wait-list group. All participants completed the pre- and post- assessments, and the intervention group received a 2.5-h workshop and practiced the HMS for 13 days. The findings were examined with a 2 × 2 mixed factorial MANOVA, univariate analyses, paired sample t-tests, and a Pearson correlational coefficient analysis between heart rate variability (HRV) measurements, personal and organization quality assessment (POQA-R4), sense of coherence (SOC-13), and Zimbardo time perspective inventory (ZTPI). Results showed significant multivariate interactions in HRV ($p < .001$), SOC-13 ($p < .05$), and ZTPI ($p < .05$) measures, all with very large effect sizes. Significant condition x time univariate interactions were observed in five 5-min resting HRV, three 3-min stress-preparation HRV, Relational Tension, Total SOC, SOC (Manageability), BTP (Balanced Time Perspective), PF (Present Fatalistic), and PN (Past Negative), all with very large effect sizes. There were noticeable directional changes and very large effect sizes observed in POQA-R4. Correlational analyses revealed that participants with higher HRV, SOC, and BTP experienced reduced stress and increased resilience. The current findings support the use of the HMS, a research-based resilience-building program consisting of simple, practical techniques that Singaporeans can use "in-the-moment" and "on-the-go," to help them build coherence and increase emotion regulation flexibility towards resilience.

Keywords: Resilience · Coherence · Emotion regulation · Emotion Flexibility · Heart Rate Variability · HeartMath · Sense of Coherence · Time Perspective

1 Introduction

The building and strengthening of resilience have been considered as the key pillar and priority of Health 2020, the World Health Organization (WHO) European policy framework for health and well-being, and the United Nations Sustainable and Development

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Goals (United Nations 2015; WHO 2017a, 2017b). Substantial evidence reported by several systematic reviews and meta-analyses (e.g., Chmitorz et al. 2018; Gheshlagh et al. 2017; Joyce et al. 2018; Lee et al. 2013) demonstrates that the concept of resilience is expedient for the development and delivery of 21st-century health services and public health programs (WHO 2017b).

The purpose of this quantitative experimental study was to examine the effectiveness of the HeartMath self-regulation skills and coherence-building program (Institute of HeartMath 2014) on both physiological and psychological measures, which are related to improved emotion regulation flexibility and personal resilience for Singaporeans. It is believed that this improvement will enhance their health and well-being.

1.1 Resilience in Singapore

According to the Cigna 360 Well-Being Survey – Well and Beyond (Cigna Corporation 2019) which collated about 13,200 responses from over 24 countries, 92% among the 502 respondents in Singapore reported higher work stress as compared to the global average of 84%, of which 13% reported that the stress as unmanageable. One study (Ee and Chang 2010) that examined the resiliency of graduate trainee teachers in Singapore found that 34.9% demonstrated average resilience and 65.1% have below average resilience. The researchers suggest the need for more intervention programs on resilience for teachers, with the emphasis in addressing emotional competencies, such as self-regulation, self-assessment, motivation, empathy, and social skills in a systematic way. In addition, a recent Gallup poll, which was conducted in 2011, surveyed 148 countries and areas, it concluded that Singapore was ranked the least emotional country in the world, with 36% reported feeling either positive or negative daily. In other words, residents in Singapore were least likely to account for feeling both positive and negative emotions (Gallup 2012).

During the last few years, several agencies in Singapore have taken active steps to promote knowledge of and skills in obtaining resilience and emotion regulation, including primary care physicians (e.g., Cheng and Tan 2016), children (e.g., Kuah et al. n.d.), children's residential group homes (e.g., Pat-Horenczyk et al. 2015), and the general community (e.g., Changi General Hospital, n.d.). However, despite the extensive effort of implementing these programs to the diverse community, the published intervention programs on resilience and emotion regulation in Singapore are scarce. Based on research, the coherence building program has shown promising results in helping individuals to achieve long-term health and wellbeing. However, there were only a handful of studies that have investigated the effectiveness of this program in Asia, such as Malaysia (Sarwari and Wahab 2018a, 2018b; Senik and Wahab 2013), Hong Kong (Low 2018), and Singapore (Morris 2010). Hence, the purpose of this quantitative experimental study was to examine the effectiveness of the HeartMath coherence-building program (Institute of HeartMath 2014) on both physiological and psychological measures, which are related to improved emotion regulation flexibility and personal resilience for Singaporeans.

1.2 The HeartMath System

The Institute of HeartMath (IHM 2014) defines resilience as "the capacity to prepare for, recover from and adapt in the face of stress, challenge or adversity" (p. 2). In this context, the term *capacity* is the key to resilience, as it refers to the amount of energy people have stored in an inner battery – energy that is available to use mentally, emotionally, and physical. A high level of resilience denotes a fully charged inner battery which embodies a higher capacity to remain one's composure, and able to take charge of one's reactions and perceive things more clearly. In other words, a person can obtain more exceptional ability to self-regulate and take charge of one's emotions in the heat of the moment when one can intelligently manage of one's energy expenditures and recharge one's inner battery. Hence, when one has more energy, one is more resilient.

The IHM (2014) suggests that the key to building resilience in order to sustain good health and optimal functioning is good management in one's emotions. This is because emotions are closely associated with resilience, where emotions are the primary drivers of numerous vital physiological processes that are engaged in energy regulation. Hence, it is by learning energy-management skills for effective self-regulation, individuals can be mindful of how and where their energy is drained that induces inflammation. With this, they can increase their personal energy reserves and thus increasing one's resilience capacity. Research has shown that the use of the HeartMath system, which employs heart-based emotion refocusing and restructuring techniques, and assistive technologies, are associated with a significant reduction in emotional stress, improved resilience, increased in health status and quality of life in both general and clinical populations (e.g., Field et al. 2018; Kim et al. 2019; Pyne et al. 2019; Sarabia-Cobo 2015; Trousselard et al. 2016).

The self-regulation techniques developed by the IHM (2014) are designed for individuals to improve psychophysiological coherence by observing their HRV via IHM's biofeedback technologies, an objective measurement of regulatory processes involved in cognitive function and affective stability (Bradley et al. 2010; McCraty et al. 2009; Thayer et al. 2009). Literature consists of both qualitative and quantitative components of research has provided strong evidence that by enhancing the heart-brain communication that is transmitted neurologically, biophysiologically, biochemically, and energetically; synchronicity or integration between them can increase coherence, HRV, autonomic stability, efficiency, improve a sense of well-being, cognitive function, and performance, and promote health (e.g., Edwards et al. 2015; Keller et al. 2017; Kermani and Birjandi 2019; McCraty and Zayas 2014; Primbram 1986; Thurber et al. 2010). Hence, individuals who commit to regular practice of the HeartMath system not only can gain internal increased awareness of energy depletion, renewal and resilience, but also acquire the "capacity to prepare for, recover from and adapt in the face of stress, challenge or adversity" (Institute of HeartMath 2014, p. 2).

2 Method

The research questions to be addressed in this study were:

1. To what extent, if any, does the practice of HeartMath coherence-building techniques over thirteen days increase psychophysiological resilience, as measured by Heart Rate Variability (HRV) and Personal and Organizational Quality Assessment (POQA-R4)?
2. To what extent, if any, does the practice of HeartMath coherence-building techniques over thirteen days increase the sense of coherence?
3. To what extent, if any, does the practice of HeartMath coherence-building techniques over thirteen days facilitate a balanced time perspective?
4. What are the factors that may improve emotion regulation flexibility?

2.1 Research Design

This study employed a 2 × 2 mixed factorial design. There were two independent variables and four dependent variables. Time (within-Ss) is one of the independent variables, which included two levels consisting of simultaneous pre-and post-testing of the HeartMath System intervention group and the wait-list control group. The other (between Ss) independent variable was presence (treatment group) or absence (control group) of the HeartMath System. The four dependent variables were the measures of heart rate variability (HRV, including both time and frequency domains), personal organization and quality assessment (POQA-R4), sense of coherence (SOC), and time perspectives (ZTPI).

2.2 Study Sample

In the literature, several studies have demonstrated large effect sizes which supported the effectiveness of the use of HeartMath System, including its patented self-regulation techniques and technology that facilitates biofeedback training to improve HRV, reduction of stress and anxiety, and improvement of subjective well-being (e.g., Field et al. 2018; Thurber et al. 2010). These findings are in line with a recent meta-analysis by Goessl et al. (2017). With that, an estimated large effect size ($\omega^2 = .15$; Keppel 1991) was considered for this study.

According to Clark-Carter (2019), "statistical power is defined as the probability of avoiding a Type II error" (p. 161), denoting rejecting the research hypothesis even though it is true. A prospective power analysis was performed to determine the required sample size to reduce Type II errors. According to Keppel (1991, p. 72), to achieve a power of between .70 to .80, with a large effect size of .15, and a significance level or alpha (a) of .05, the target sample size requires around 14 to 17 participants for each group. This study attempted to recruit a total of 40 participants (20/group) to account for attrition.

2.3 Participants

The participants studied in this research study resided in Singapore at the point of data collection. The inclusion criteria for the study consisted of adults between the ages of 18–65, with no declared major physical or mental health concerns, and were required to have the ability to read and write in English. The primary exclusion criteria were the presence of an existing heart condition, which may affect the baseline HRV measurements. The final sample size for this study was 34 participants (see Fig. 1). Females' mean age was 39.9 ($SD = 10.47$, age range: 24–63 years), and males' mean age was 38.21 ($SD = 9.17$, age range: 22–52 years).

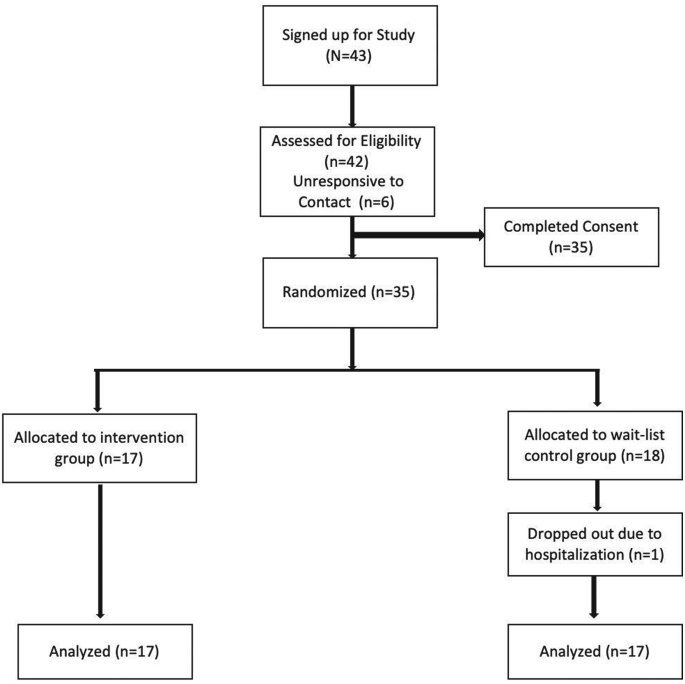

Fig. 1. Recruitment flow chart

This study was approved by the California Southern University Institutional Review Board (IRB) on 30th September, 2019.

2.4 Instrumentation

In this study, several instruments were used to assess the effectiveness of the HeartMath System in the non-clinical population. They were categorized into physiological assessment and psychological and behavioral assessments. HRV is the physiological assessment to quantify physiological coherence variables. The three questionnaires are the psychological and behavioral assessments that were used to quantify resilience, sense of coherence, and time perspective.

Physiological Assessment

2.4.1 Heart Rate Variability (HRV)

HRV was measured with the biofeedback pulse sensor tool, the emWave Pro Plus (Institute of HeartMath, Boulder Creek, CA). It is a HeartMath patented computer-based heart rhythm technology that is based on decades of research on stress, emotions, and performance that objectively monitors heart rhythms and displays the physiological coherence, an optimal physiological state. With either a finger or earlobe pulse sensor that is plugged to a computer, the emWave software program measures the interval between each heartbeat and then computes and displays the coherence level on the computer monitor. This interbeat interval (IBI) data that includes a number of standard indices of HRV is presented with advanced graphic information that provides both the researcher and the participant a real-time "mirror" of the participant's heart rhythm patterns which is the results of one's attitudes and emotional response to stress (Institute of HeartMath 2017) (see Fig. 2 for the example of the computer monitor HRV reading).

In this study, both time domain and frequency domain parameters were used. Within the time domain parameters, SDNN is the sinus-initiated IBIs measured in milliseconds that reflects the ebb and flow of all the factors contributing to HRV as well the heart's ability to respond to hormonal changes (Task Force 1996; Umetani et al. 1998). The RMSSD is the root mean square of successive differences between normal heartbeats, reflecting the beat-to-beat variance in heart rate. The RMSSD is the primary time domain measure used to evaluate the vagally mediated changes reflected in HRV. Within the frequency domain parameters, the Total Power is the sum of the energy in the VLF, LF, and HF bands for short-term recordings (Shaffer et al. 2014). The LF/HF ratio reflects the global sympathetic/vagal balance (Sztajzel 2004). The normalized coherence is a frequency domain measure of coherence in the heart rhythm pattern. It is determined by quantifying the power spectral density (PSD) across the greatest peak in the coherence range and dividing it by the PSD total power, which yields a normalized coherence score ranging from 0–100 (HeartMath Inc, 2018).

The resting baseline HRV was obtained based on the short-term ~ 5 min HRV data, which has been widely utilized as a standard for HRV analysis. It is a most commonly found source of published HRV data due to the relatively ease of recording as well as reproducibility (Shaffer and Ginsberg 2017). Although various recording periods are frequently used, the Task Force (1996) has maintained that the analysis should be done on 5-min segments as it has demonstrated large effects on both HRV frequency and time domain values. Additionally, studies have shown that the 5-min HRV recording demonstrated its suitability in screening the variation of heart rates (Min et al. 2008; Shaffer et al. 2014).

Fig. 2. emWave pro plus computer hardware and HRV monitor reading (HeartMath Inc 2018)

Psychological and Behavioral Assessment

2.4.2 Personal and Organizational Quality Assessment (POQA)

The Personal and Organizational Quality Assessment – Revised 4 Scale (POQA-R4) is a tested, valid, and reliable instrument developed by the Institute of HeartMath (IHM 2011). The POQA-R4 is a subjectively self-reported stress questionnaire designed to reflect the key psychological and workplace elements that contribute to the overall quality and effectiveness of an organization.

The questionnaire entails four primary scales and nine multi-item subscales of workplace quality, which have a direct impact on health and job performance. These four factors are Emotional Vitality, Emotional Stress, Organization Stress, and Physical Stress.

The responses for each question will be gathered through two formats of a 7-point ordinal Likert-type scale, ranging from "Not at all" to Always" for items 1 to 40, and "Strongly Disagree" to "Strongly Agree" for items 41 to 52 (Institute of HeartMath 2011).

The psychometric analysis of the reorganization of the 49 items into the new framework has been verified by validity and reliability of measurement study conducted on the existing POQA-R database of 5,971 working adults. The findings for the four primary scales revealed that all constructs surpassed the criterion for technical adequacy ($a > .75$; Institute of HeartMath 2011).

2.4.3 Orientation to Life Questionnaire (SOC-13)

The Sense of Coherence (SOC) measure was assessed on the abbreviated 13-item version of Antonovsky's (1987) Orientation to Life Questionnaire (OLQ) to obtain quantitative data. The SOC-13 scale has three components: Comprehensibility, Manageability, and Meaningfulness. The questionnaire includes a 7-point Likert-type scale for each item with two fixed contradictory responses at opposing ends of the scale, for instance, "very often or never" to "very seldom" as response to questions such as "Do you have the feeling that you don't really care about what goes on around you?" The sum of the scores for SOC-13 is 13 (low SOC) to 91 (highest possible SOC). The higher the score, the stronger the SOC (Antonovsky 1987). Eriksson and Lindstrom (2005) found the Cronbach's alpha in 127 studies using SOC-13 range from .70 to .92.

2.4.4 Zimbardo Time Perspective Inventory (ZPTI)

The ZTPI is a 56-item scale comprises of five subdimensions with each is assessed using a 5-point scale (1 = very untrue, 5 = very true). Nine items measure the past positive (PP) perspective which reflects pleasant and sentimental views of one's past (e.g., "Happy memories of good times spring readily to mind"). Ten items measure the past negative (PN) which represents negative attitudes toward a past full of anxiety, regret, and traumatic events (e.g., "Painful past experiences keep being replayed in my mind"). Fifteen items measure the present hedonistic (PH) which signifies risky attitudes to life and a focus on pleasure ("here and now") (e.g., "I take risks to put excitement in my life"). Nine items measure the present fatalistic (PF) which denotes the perception of life as something uncontrollable and possesses a passive expectation of what life brings (e.g., "It doesn't make sense to worry about the future, since there is nothing that I can do about it anyway"). Thirteen items measure the future (F) perspective which reflects goal directed behavior (e.g., "When I want to achieve something, I set goals and consider specific means for reaching those goals").

Researchers have proposed that the scores for an individual to achieve a balanced time perspective (BTP), when assessed with ZTPI (Wiberg et al. 2012; Zimbardo and Boyd 2008). The ZTPI has shown to be a reliable and valid measure over the years. Cronbach's alpha for ZTPI English version ranging from .68 to .82 (Boniwell et al. 2010). Deviation from the Balanced Time Perspective (DBTP: Stolarski et al. 2011) based on the ZPTI scores will be employed as a continuous indicator of BTP. The DBTP measures the difference between an individual's TP and the optimal BTP profile. A study conducted by Zhang et al. (2013) found that DBTP is the most optimal among available

methods such as the cut-off point approach (Drake et al. 2008) and the cluster analysis (Boniwell et al. 2010), and is most strongly correlated with subjective well-being. Lower DBTP scores reflects a higher level of balance (Stolarski et al. 2011).

2.5 Procedure

Following the completion of the informed consent process, all participants regardless of the HMS intervention group or the wait-list control group were administered with pre-study and post-study surveys and assessments at the first session and the conclusion of the study (see Fig. 3). All sessions were conducted by the principal researcher (PR), at his office which was a controlled, quiet environment conducive to relaxation. Data was collected during the morning session. It was a mid-size office which was divided by a partition that allowed participants to have a private space during the data collection phase. Also, the office can accommodate about 20 participants and provided them a safe and quiet environment during the HMS training workshop.

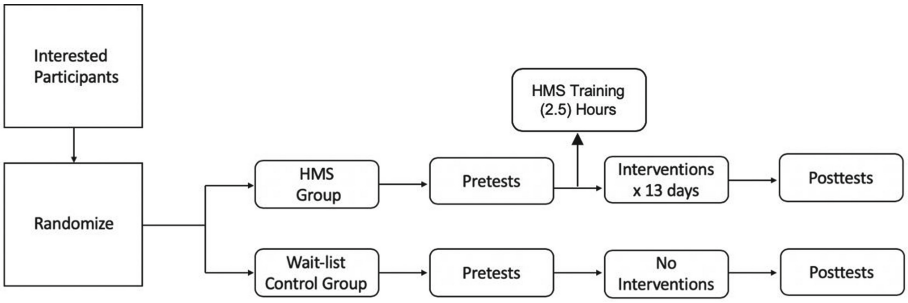

Fig. 3. Flow chart illustrating plan of study.

During the HRV assessments, participants were recorded individually. HRV was measured with the emWave ear sensor. The sensor was placed on one of their earlobes which is powered by the emWave USB sensor module that interprets the data transmitting to the software program, the emWave Pro Plus. The HRV assessments comprise the two steps protocol (McCraty, personal e-mail, March 1, 2019), which took an average of ten minutes for each participant. The assessments will be performed as follows:

1. Five-minute resting HRV assessment:
   Participants are required to be seated and imagine they are waiting for the bus with absence of any activities (e.g., chewing of gum, or reading magazines).
   Printed instructions to participants: Please sit quietly and relax for 5 minutes without talking, try to remain as still as possible without sacrificing comfort. Do not engage in intense mental or emotional activity. Also, do not engage with any physical activity such as eating a sweet or reading a magazine, as well as making any significant or rapid body movements. Keep your eyes open to avoid falling asleep. Do not meditate or use other similar practices. Just sit quietly as if you were waiting at the bus stop for the bus.

2. Stress preparations (3 min):
   Printed instructions: During the next 3 minutes, please do the following. As if you were preparing yourself mentally and emotionally for an important upcoming event or activity. Focus your attention in the center of your chest. Try and activate and experience a positive feeling such as care or appreciation for someone or something or some special place.

Upon the completion of the HRV assessments, each participant was requested to complete three sets of questionnaires. The SOC-13 and ZTPI were paper-and-pencil administered questionnaires while participants were provided with an iPad to complete the POQA-R4 web-based survey. Due to the limited availability of laptops with installed emWave Pro Plus software that were used to collect HRV data, the pretests of the HMS intervention group and the wait-list control group were performed one day apart. The data was collected from October 19, 2019 to November 24, 2019.

HMS Training Session. Participants who were randomly assigned to the HMS intervention group received a 2.5-h training workshop one day after the pretest session. The workshop was conducted at the PR's office, where he led the training. Beverages and snacks were provided for the participants. The 2.5-h training workshop was based on HeartMath's Resilience Advantage training program (2014) where the PR has strategically selected relevant modules to help participants to learn and apply practical resilience and emotion regulation skills. The PR is a HeartMath Certified Practitioner and a HeartMath Certified Trainer, where he is qualified to administer and interpret the HRV assessments and conduct a workshop teaching the HMS techniques to a class.

The workshop was divided into two parts: 1) Basic concepts of resilience, depleting and renewing emotions, balanced care and overcare, and the physiology of coherence and optimal functioning; 2) Explanation and practice HeartMath (HM) coherence-building techniques: Heart-focused Breathing, Quick Coherence Technique, Freeze-Frame Technique, and Heart Lock-In Technique. The group had learned how to use the HeartMath Inner Balance Monitor, a portable device that monitors and provides psychophysiological coherence biofeedback which was loaned to each participant. Each HMS intervention group participant received Resilience Advantage worksheets and cue cards on how to practice the HM self-regulation techniques. As the Inner Balance is a Bluetooth device that connects to phones that run either on Android or iOS, the operation of the Inner Balance was taught during the workshop.

Daily Practice. As part of the study, each participant was required to practice HM coherence-building techniques with the aid of the Inner Balance device. They were required to practice the Heart Lock-In, an emotion restructuring technique for 8 min, twice a day, for 13 days. Participants were instructed to take a screenshot of their completed practices which will serve as a practice log, which the participants will have to send to the PR via e-mail at the conclusion of the study. In order to ensure consistency, all participants were guided to customize to the same settings in the Inner Balance app, as shown below:

i) Switch off all volume (music and sound effects);

ii) Set challenge level to level 2;
iii) Set breath pacer to 10 s per breath;
iv) Set session timer to 8 min

Participants were encouraged to practice and use the emotion refocusing techniques such as Quick Coherence and Freeze Frame when they are feeling stressed or overwhelmed by difficult situations to achieve a state of "active calm" and make sound decisions.

Posttests. At the conclusion of the study, all participants returned to PR's office to have their post-study HRV assessments measured and filled out the three questionnaires. The HMS intervention group were requested to return the Inner Balance to the PR, and the wait-list control group were provided with information on the workshop. The PR has offered compensation to all participants who completed all required sessions. All participants in both groups received a $20 supermarket voucher as well as being entitled to a lucky draw chance to win a HeartMath Inner Device worth $220.

2.6 Statistical Analysis of Data

The web-based POQA-R4 surveys were sent directly to the Institute of HeartMath (IHM) for data analysis when participants have completed the questionnaire. The IHM has then provided an aggregate analysis and group report to the PR. All other statistical data analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 26.0; IBM Corp 2019). The significance or alpha level for all analyses were set at .05.

A 2 (Condition: HMS Intervention Group versus Wait-list Control Group) x 2 (Time: Pre-test versus Post-test) mixed factorial MANOVA, univariate tests, paired sample t-test, and Pearson's correlation coefficient analysis were performed on HRV measurements, POQA-R4, SOC-13, and DBTP to analyze the data for significant results.

3 Results

Descriptive statistics of the HMS intervention group and the wait-list control group, consisting of results from the pre- and post-test assessments can be found in Table 1.

3.1 Research Question One: to what Extent, if any, does the Practice of HeartMath Coherence-Building Techniques over Thirteen Days Increase Psychophysiological Resilience, as Measured by HRV and POQA-R4?

HRV measurements reflect improvement in physiological resilience and POQA-R4 reflect improvement in psychological resilience.

Table 1. Pre- and post-tests mean comparison for all outcome variables by group

	HeartMath System Group						Wait-list Control Group					
	Pre		Post				Pre		Post			
Measures	*M*	*SD*	*M*	*SD*	*t*	*p*	*M*	*SD*	*M*	*SD*	*t*	*p*
5-Minute Resting HRV												
Mean Heart Rate (BPM)	81.32	9.69	83.79	9.50	1.47	.161	79.36	8.70	75.02	10.73	-1.73	.102
Mean Inter-beat Interval (ms)	749.7	90.07	728.6	90.61	-1.43	.172	767.5	85.63	818.3	122.5	1.97	.067
SDNN (ms)	34.28	13.59	44.20	19.30	2.97	.009**	39.34	19.94	41.79	12.34	0.59	.563
Ln RMSSD (ms)	3.27	0.27	3.41	0.21	2.65	.018*	3.36	0.34	3.45	0.34	1.28	.219
Ln Total Power (ms2/Hz)	5.55	0.84	6.11	1.04	2.78	.013*	5.84	1.06	5.95	0.75	0.65	.526
LnVLF (ms2/Hz)	4.51	0.83	4.56	0.88	0.27	.788	4.65	1.10	4.74	0.74	0.45	.660
LnLF (ms2/Hz)	4.34	1.02	5.33	1.48	2.62	.018*	4.58	1.16	4.55	1.24	-0.13	.902
LnHF (ms2/Hz)	3.95	1.03	3.86	0.88	-0.49	.626	4.21	1.11	4.41	1.03	1.09	.290
Ln LF/HF Ratio (ms2/Hz)	0.38	0.71	1.48	1.57	2.59	.019*	0.35	0.81	0.16	0.98	-0.89	.387
Normalized Coherence (%)	40.26	7.96	57.89	18.26	4.05	.000***	40.00	13.38	38.15	9.50	-0.66	.517
3-Minute Stress-Prep HRV												
Mean Heart Rate (BPM)	82.71	10.07	82.58	9.51	-0.07	.949	79.72	9.02	75.58	11.04	-1.64	.121
Mean Inter-beat Interval (ms)	737.5	89.55	739.7	89.79	0.12	.903	764.0	89.34	813.04	120.2	1.91	.075
SDNN (ms)	35.51	12.97	48.69	19.61	3.22	.005**	37.31	17.17	41.47	14.49	0.93	.366
Ln RMSSD (ms)	3.32	0.28	3.35	0.20	0.42	.68	3.36	0.36	3.42	0.33	0.79	.438
Ln Total Power (ms2/Hz)	5.61	0.80	6.38	1.14	3.24	.005**	5.72	1.09	5.82	0.72	0.39	.698
LnVLF (ms2/Hz)	4.49	0.73	4.29	0.91	-1.16	.263	4.73	1.29	5.01	0.79	0.85	.407
LnLF (ms2/Hz)	4.61	1.06	5.78	1.64	3.31	.004**	4.36	1.36	4.16	0.93	-0.23	.822
LnHF (ms2/Hz)	3.92	1.09	3.69	0.97	-1.03	.32	4.16	1.18	4.36	0.88	0.75	.462
Ln LF/HF Ratio (ms2/Hz)	0.70	0.61	2.10	1.82	3.67	.002**	0.19	0.85	0.06	0.89	-0.43	.672
Normalized Coherence (%)	39.27	7.25	71.65	17.17	7.62	.000***	40.48	11.47	36.47	10.11	-1.41	.178
POQA-R4												
Emotional Vitality	4.21	0.99	4.31	1.07	0.90	.382	4.55	1.08	4.53	1.04	-0.18	.858
Emo Buoyancy	4.19	1.08	4.28	1.09	0.63	.538	4.70	1.13	4.54	1.01	-1.08	.298
Emo Contentment	4.23	0.99	4.36	1.16	0.82	.423	4.35	1.21	4.51	1.23	1.03	.318
Organizational Stress	4.10	0.88	3.90	0.91	-0.97	.348	3.86	0.98	4.00	0.98	1.18	.255
Pressures of Life	3.99	1.27	3.85	1.04	-0.55	.593	3.83	1.35	3.85	1.34	0.13	.900
Relational Tension	4.55	1.33	4.08	1.76	-1.61	.126	4.27	1.53	4.49	1.58	1.27	.226
Stress	7.71	3.04	7.87	3.16	0.15	.884	6.76	3.63	7.44	3.50	0.54	.592
Emotional Stress	2.45	0.64	2.32	0.67	-1.08	.297	2.43	0.78	2.32	0.81	-1.39	.179
Anxiety/Depression	2.57	0.79	2.36	0.64	-1.43	.172	2.37	0.83	2.34	0.88	-0.47	.637
Anger/Resentment	2.34	0.57	2.29	0.79	-0.37	.712	2.49	0.82	2.31	0.84	-1.46	.167
Physical Stress	2.96	1.00	2.77	0.90	-1.33	.201	2.58	0.94	2.61	0.94	0.19	.847
Fatigue	3.59	1.45	3.34	1.18	-1.17	.261	3.19	1.37	3.12	1.32	-0.58	.569
Health Symptoms	2.54	0.78	2.38	0.78	-1.35	.197	2.20	0.77	2.26	0.82	0.62	.537
Intention to Quit	2.74	1.51	2.88	1.36	0.70	.492	3.00	1.80	3.38	1.70	2.34	.033*
SOC-13												
Comprehensibility	20.88	4.50	21.59	4.30	1.01	.329	21.53	5.51	21.71	5.42	0.21	.837
Manageability	17.47	3.84	20.71	3.18	3.86	.001***	17.59	2.35	17.24	3.01	-0.60	.556
Meaningfulness	20.35	4.70	20.41	3.69	0.08	.939	21.12	2.64	20.18	3.26	-1.49	.156
Total SOC	58.71	10.50	62.71	8.63	3.73	.002**	61.15	8.98	59.12	9.18	-0.63	.296
ZPTI												
Past Positive	3.54	0.52	3.64	0.47	1.28	.218	3.68	0.32	3.63	0.34	-0.98	.340
Past Negative	3.02	0.50	2.74	0.49	-3.07	.007***	2.72	0.60	2.66	0.50	-0.92	.373
Present Hedonistic	3.38	0.50	3.35	0.48	-0.41	.687	3.36	0.36	3.30	0.30	-1.51	.151
Present Fatalistic	2.71	0.73	2.50	0.64	-2.56	.021*	2.44	0.40	2.56	0.43	1.82	.087
Future	3.74	0.40	3.77	0.33	0.38	.706	3.67	0.43	3.58	0.40	-1.86	.083
DBTP	2.24	0.70	1.90	0.66	-3.63	.002***	1.85	0.43	1.91	0.49	0.82	.426

Note. N= 34; intervention = 17, control = 17. * p < .05, **p < .01, ***p < .001. HRV = Heart Rate Variability; POQA-R4 = Personal and Organizational Quality Assessment (Revised 4 Scale); SOC-13 = Sense of Coherence 13-item Scale; ZPTI = Zimbardo Time Perspective Inventory. Physiological assessment was measured with HRV. Psychological and behavioral assessments were measured with POQA-R4, SOC-13, and ZTPI.

HRV Measurements

5-min Resting HRV Measures. The mixed factorial MANOVA was performed to test the effectiveness of the HMS system on the 5-min resting HRV measures. A multivariate condition x time interaction, Wilks' $\Lambda = .413$, $F(1, 34) = 3.27$, $p < .01$, $\eta p2 = .587$, was observed.

Significant univariate effects were observed for five of the ten 5-min resting HRV measures: SDNN, $F(1, 34) = 5.39$, $p < .05$, $\eta p2 = .144$; LnRMSSD, $F(1, 34) = 6.74$, $p < .05$, $\eta p2 = .174$; LnTP (Total Power), $F(1, 34) = 6.41$, $p < .05$, $\eta p2 = .167$; LnLF

(Low Frequency), $F(1, 34) = 4.68$, $p < .05$, $\eta p2 = .128$; and Normalized Coherence, $F(1, 34) = 9.30$, $p < .01$, $\eta p2 = .225$. Significant univariate condition x time interaction were observed for five of the ten 5-minute resting HRV measures: Mean Heart Rate, $F(1, 34) = 5.10$, $p < .05$, $\eta p2 = .138$; Mean Inter-Beat Interval (MIBI), $F(1, 34) = 5.85$, $p < .05$, $\eta p2 = .155$; LnLF, $F(1, 34) = 5.27$, $p < .05$, $\eta p2 = .141$; LnLF/HF Ratio, $F(1, 34) = 7.34$, $p < .05$, $\eta p2 = .186$; and Normalized Coherence, $F(1, 34) = 14.19$, $p < .01$, $\eta p2 = .307$. These interaction effects indicate that the differences between the HMS group and the WLG group on the linear combination of the 5-min resting HRV measures are significantly greater at post-test than pre-test.

3-min Stress Prep HRV Measures. The mixed factorial MANOVA was performed to test the effectiveness of the HMS system on the 3-min Stress Prep HRV measures. There was a significant multivariate main effect of condition, Wilks' $\Lambda = .371$, $F(1, 34) = 3.90$, $p < .01$, $\eta p2 = .629$. Significant multivariate effects were also observed for the main effects of time, Wilks' $\Lambda = .447$, $F(1, 34) = 2.85$, $p < .05$, $\eta p2 = .553$, as well as a multivariate condition x time interaction, Wilks' $\Lambda = .225$, $F(1, 34) = 7.90$, $p < .001$, $\eta p2 = .775$. This interaction effect indicates that the differences between the HMS group and the WLG group on the linear combination of the 3-min Stress Prep HRV measures are significantly greater at post-test than pre-test. Significant main effects were observed for five of the nine 3-min resting HRV measures: SDNN, $F(1, 34) = 8.20$, $p < .01$, $\eta p2 = .204$; LnTP, $F(1, 34) = 6.30$, $p < .05$, $\eta p2 = .164$; LnLF, $F(1, 34) = 7.41$, $p < .05$, $\eta p2 = .188$; LnLF/HF Ratio, $F(1, 34) = 7.15$, $p < .05$, $\eta p2 = .183$; and Normalized Coherence, $F(1, 34) = 30.75$, $p < .001$, $\eta p2 = .490$.

Significant univariate condition x time interaction were observed for three of the nine 3-min resting HRV measures: LnLF, $F(1, 34) = 5.93$, $p < .05$, $\eta p2 = .156$; LnLF/HF Ratio, $F(1, 34) = 10.19$, $p < .01$, $\eta p2 = .241$; and Normalized Coherence, $F(1, 34) = 50.61$, $p < .001$, $\eta p2 = .613$. These interaction effects indicate that the differences between the HMS group and the WLG group on the linear combination of the 3-min resting HRV measures are significantly greater at post-test than pre-test.

POQA-R4 Results

The mixed factorial MANOVA was performed to test the effect of HMS system on POQA-R4. A multivariate main effect on time, Wilks' $\Lambda = .303$, $F(1, 34) = 3.53$, $p < .01$, $\eta p2 = .697$, was observed. Univariate tests were performed to assess the effects on the four primary scales and the nine subscales. Relational Tension, $F(1, 34) = 4.13$, $p = .050$, $\eta p2 = .114$, is the only significant effect of group x pre-post interaction established. This interaction effect indicates that the differences between the HMS group and the WLG group on the linear combination of the POQA-R4 measures are significantly greater at post-test than pre-test.

Although the majority outcomes of the intervention that the HMS group received did not reach statistical significance, the raw score means (see Table 2) showed increased positive change in almost all factors as compared to the control group. The primary and subscales, as reported by the POQA-R4, in comparison to a large sample of 5791 employees, demonstrated consistently, desired directional changes in contrast to the control group (see Figs. 4 and 5). While the "Intention to Quit" factor has shown an increase for both groups, the WLG group had more participants (13%; $t(17) = 2.34$, p

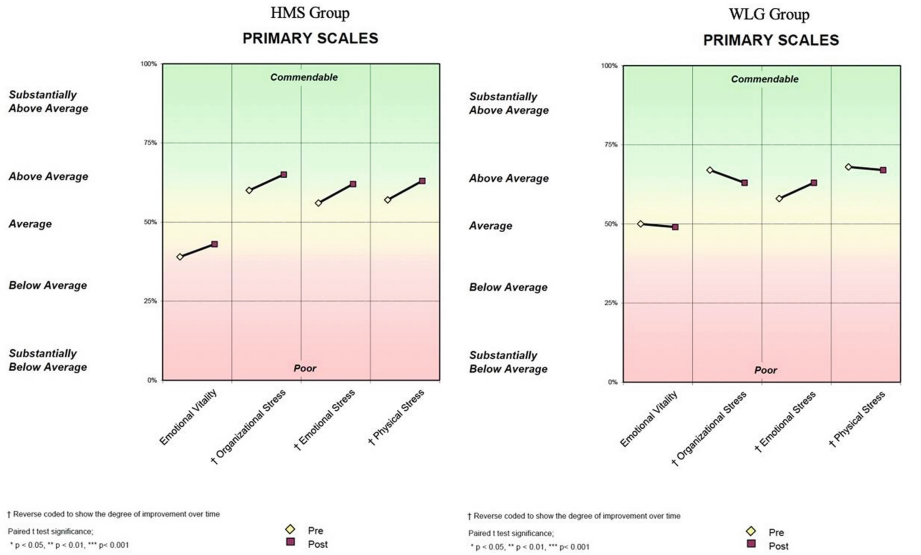

Fig. 4. Primary scales scores for both groups in comparisons to a large sample of 5791 employees as reported in POQA-R4.

$< .05$) thinking of quitting their job as compared to the HMS group (5%; $t(17) = .70$, $p = .492$).

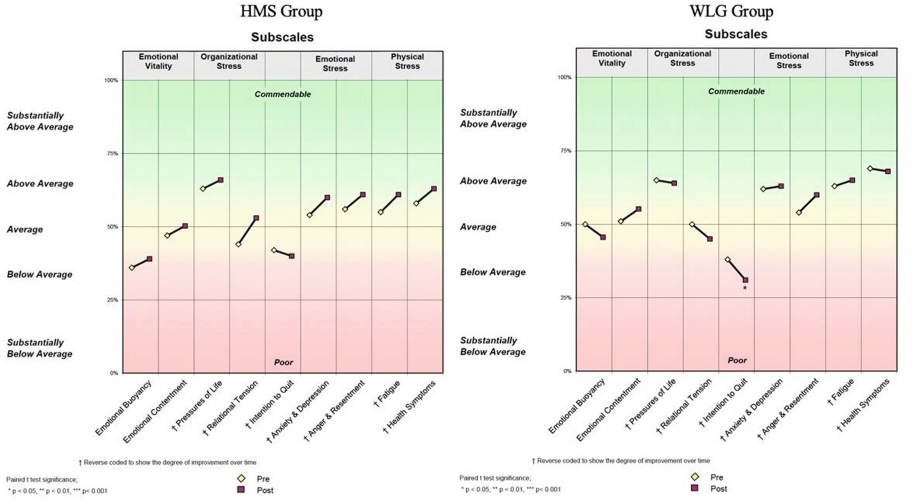

Fig. 5. Subscales scores for both groups in comparisons to a large sample of 5791 employees as reported in POQA-R4.

Table 2. Raw score means for POQA-R4 survey

	HeartMath System Group				Wait-list Control Group			
	Pre	Post	*% Change*	*Significance*	Pre	Post	*% Change*	*Significance*
Emotional Vitality	4.21	4.31	2%	ns	4.55	4.53	0%	ns
Emo Buoyancy	4.19	4.28	2%	ns	4.70	4.54	-3%	ns
Emo Contentment	4.23	4.36	3%	ns	4.35	4.51	4%	ns
Organizational Stress	4.10	3.90	-5%	ns	3.86	4.00	4%	ns
Pressures of Life	3.99	3.85	-4%	ns	3.83	3.85	1%	ns
Relational Tension	4.55	4.08	-10%	ns	4.27	4.49	5%	ns
Stress	7.71	7.87	2%	ns	6.76	7.44	10%	ns
Emotional Stress	2.44	2.32	-5%	ns	2.43	2.32	-5%	ns
Anxiety/Depression	2.57	2.36	-8%	ns	2.37	2.34	-1%	ns
Anger/Resentment	2.34	2.29	-2%	ns	2.49	2.31	-7%	ns
Physical Stress	2.96	2.77	-6%	ns	2.58	2.61	1%	ns
Fatigue	3.59	3.34	-7%	ns	3.19	3.12	-2%	ns
Health Symptoms	2.54	2.38	-6%	ns	2.20	2.26	3%	ns
Intention to Quit	2.74	2.88	5%	ns	3.00	3.38	13%	.033*

3.2 Research Question Two: to what Extent, if any, does the Practice of HeartMath Coherence-Building Techniques over Thirteen Days Increase the Sense of Coherence?

The mixed factorial MANOVA was performed to test the effect of HMS system on SOC. There was a multivariate condition x time interaction for SOC scores Wilks' $\Lambda = .674$, $F(1, 34) = 3.51$, $p < .05$, $\eta p2 = .326$. Univariate tests indicated that main effects on SOCMA $F(1, 34) = 7.93$, $p < .01$, $\eta p2 = .199$, and a significant condition x time interaction for SOCMA $F(1, 34) = 12.29$, $p < .01$, $\eta p2 = .278$ were observed. The HMS group showed a dramatic increase in SOCMA, while the WLG group showed a slight decrease. This interaction effect indicates that the differences between the HMS group and the WLG group on the linear combination of the SOCMA are significantly greater at post-test than pre-test.

A significant condition x time interaction for Total SOC $F(1, 34) = 7.76$, $p < .01$, $\eta p2 = .195$ was observed. Again, there was a dramatic increase in Total SOC for the HMS group, accompanied by a decrease for the WLG group. This interaction effect indicates that the differences between the HMS group and the WLG group on the linear combination of the Total SOC are significantly greater at post-test than pre-test.

3.3 Research Question Three: to what Extent, if any, does the Practice of HeartMath Coherence-Building Techniques over Thirteen Days Facilitate a Balanced Time Perspective?

The mixed factorial MANOVA was performed to test the effect of HMS system on ZTPI. Significant multivariate effects were found for the main effects of time, Wilks' $\Lambda = .647$, $F(1, 34) = 2.46$, $p = .05$, $\eta p2 = .353$, as well as a multivariate condition x time interaction, Wilks' $\Lambda = .607$, $F(1, 34) = 2.91$, $p < .05$, $\eta p2 = .393$. This interaction effect indicates that the difference between the HMS group and the WLG group on the linear combination of the ZTPI scores are significantly greater at post-test than pre-test.

Univariate tests indicated that main effects on the ZTPI Balanced Time Perspective (BTP; DBTP scores), $F(1, 34) = 5.64$, $p < .05$, $\eta p2 = .150$, as well as a condition x

time interaction, $F(1, 34) = 11.38$, $p < .01$, $\eta p2 = .262$ were observed. There was a dramatic decrease in DBTP scores for the HMS group, accompanied by an increase for the WLG group. There were main effects on ZTPI Past Negative (PN), $F(1, 34) = 9.24$, $p < .01$, $\eta p2 = .224$, and a group x pre-post interaction, $F(1, 34) = 3.97$, $p = .028$ (one-tailed), $\eta p2 = .110$. There was a condition x time interaction, $F(1, 34) = 9.82$, $p < .01$, $\eta p2 = .235$. Again, the HMS group showed a decrease in FP, while the WLG group showed an increase. All these interaction effects indicate that the difference between the HMS group and the WLG group on the linear combination of the above ZTPI scores are significantly greater at post-test than pre-test.

3.4 Research Question Four: What are the Factors that may Improve Emotion Regulation Flexibility? (See Table 3).

Age

Significant negative correlations were found between several measures: 5-min SDNN ($r = -.631$, $p < .01$), 5-min Ln Total Power ($r = -.537$, $p < .05$), 5-min Normalized Coherence ($r = -.593$, $p < .05$). This result indicates that the older participants have lower SDNN, LnTP, and Normalized Coherence.

Gender

Significant negative correlation was observed between gender and 5-min Ln RMSSD ($r = -.554$, $p < .05$). This indicates that the female participants have lower strength of autonomic nervous system, particularly the parasympathetic branch.

5-min Resting HRV and ZTPI

Significant negative correlations were found between six 5-min HRV measures and only one (Present Fatalistic; [PF]) of five ZTPI measures. SDNN ($r = -.708$, $p < .01$), Ln Total Power (TP; $r = -.733$, $p < .01$), Ln Very Low Frequency (VLF; $r = -.677$, $p < .01$), Ln Low Frequency (LF; $r = -.569$, $p < .05$), Ln High Frequency (HF; $r = -.539$, $p < .05$), and Normalized Coherence (NC; $r = -.497$, $p < .05$). These results indicate that participants with higher resting HRV (SDNN, LnTP, LnVLF, LnLF, LnHF, and NC) tend to have lower tendency of believing that they have no influence on future outcomes or that the future is predestined.

5-min Resting HRV and POQA-R4

Significant negative correlations were found between four 5-min HRV measures and Intention to Quit: SDNN ($r = -.629$, $p < .01$), LnTP ($r = -.561$, $p < .05$), LnHF ($r = -.542$, $p < .05$), and NC ($r = -.687$, $p < .01$). These results indicate that participants with higher resting HRV (SDNN, LnTP, LnHF, and NC) tend to lower intention to quit their jobs. A significant negative relationship was also observed between LnRMSSD and Health Symptoms ($r = -.497$, $p < .05$), indicating that the higher the parasympathetic

Table 3. Correlational table

Pearson Correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1	Age	1																																													
2	Gender	0.041	1																																												
5-Minute Resting HRV																																														
3	Mean Heart Rate (BPM)	0.152	0.228	1																																										
4	Mean Inter-Beat Interval	-0.125	-0.243	-.991**	1																																									
5	SDNN (ms)	-.631**	-0.001	-.519*	.495*	1																																								
6	LnRMSSD (ms)	-0.466	-.554*	-0.334	0.343	0.419	1																																							
7	Ln Total Power (ms2/Hz)	-.537*	0.012	-.622**	.584*	.945**	0.423	1																																						
8	Ln Very Low Frequency (ms2/Hz)	-0.275	0.177	-0.458	0.39	.738**	0.121	.772**	1																																					
9	Ln Low Frequency (ms2/Hz)	-0.464	0.022	-0.465	0.438	.887**	0.356	.932**	.623**	1																																				
10	Ln High Frequency (ms2/Hz)	-0.401	-0.182	-.486*	0.457	0.378	.684**	0.459	0.258	0.191	1																																			
11	Ln Low Frequency/High Frequency Ratio (ms2/Hz)	-0.21	0.123	-0.181	0.172	.604*	-0.017	.623**	0.449	.844**	-0.364	1																																			
12	Normalized Coherence (%)	-.593*	-0.129	-0.473	0.48	.775**	0.398	.744**	0.284	.732**	0.31	.518*	1																																		
3-Minute Stress Prep HRV																																														
13	Mean Heart Rate (BPM)	0.148	-0.003	.924**	-.960**	-.522*	-0.217	-.619**	-0.462	-0.478	-0.435	-0.228	-0.387	1																																	
14	Mean Inter-Beat Interval	-0.108	0.01	-.925**	.921**	.498*	0.196	.588*	0.426	0.459	0.399	0.229	0.376	-.994**	1																																	
15	SDNN (ms)	-0.311	0.308	-0.288	0.273	.719**	0.155	.684**	.622**	.564*	0.338	0.355	.489*	-0.386	0.379	1																																
16	LnRMSSD (ms)	-0.301	0.046	-.630**	.630**	.527*	0.421	.696**	0.329	.483*	.638**	0.129	.513*	-.714**	.716**	.671**	1																															
17	Ln Total Power (ms2/Hz)	-0.374	0.318	-0.413	0.387	.732**	0.193	.769**	.653**	.672**	0.389	0.431	.533*	-.590*	.487*	.930**	.727**	1																														
18	Ln Very Low Frequency (ms2/Hz)	-.679**	0.193	-0.26	0.259	.693**	0.195	.541*	0.478	0.46	0.204	0.306	.513*	-0.227	0.237	0.454	0.268	0.398	1																													
19	Ln Low Frequency (ms2/Hz)	-0.112	0.422	-0.246	0.217	.562*	-0.036	.639**	.603*	.656**	0.068	.595*	0.366	-0.359	0.351	.829**	.510*	.910**	0.167	1																											
20	Ln High Frequency (ms2/Hz)	-0.387	-0.181	-.647**	.644**	0.456	.553*	.592*	0.218	0.313	.892**	-0.144	.499*	-.598*	.593*	0.354	.898**	0.459	0.331	0.13	1																											
21	Ln Low Frequency/High Frequency Ratio (ms2/Hz)	0.108	0.481	0.128	-0.153	0.27	-0.336	0.506	0.428	0.424	-0.372	.617**	0.065	-0.002	-0.004	.567*	0.032	.583*	-0.032	.844**	-0.421	1																								
22	Normalized Coherence (%)	-0.161	0.331	-0.4	0.359	.681*	-0.029	.638**	.632**	.486*	0.323	0.295	0.375	-.487*	0.458	.829**	.681*	.868**	0.122	.849**	0.237	.682**	1																								
Sense of Coherence (SOC-13)																																														
23	Comprehensibility	0.257	0.065	0.082	-0.055	-0.154	0.01	-0.139	-0.04	-0.251	0.23	-0.366	-0.041	0.146	-0.124	0.027	0.112	0.03	-0.192	-0.039	0.284	-0.184	0.037	1																						
24	Manageability	-0.26	-0.063	0.07	-0.029	0.414	0.439	0.37	0.13	0.328	0.311	0.14	0.457	0.078	-0.075	0.27	0.267	0.227	0.146	0.09	0.33	-0.106	0.073	0.462	1																						
25	Meaningfulness	-0.177	-0.24	0.384	-0.36	-0.084	0.258	-0.172	-0.08	-0.204	-0.005	-0.208	0.068	.627**	-.627**	-0.188	-0.495	-0.276	0.127	-0.337	-0.159	-0.218	-0.258	0.354	0.357	1																					
26	Total SOC	-0.043	-0.094	0.231	-0.192	0.04	0.277	-0.007	-0.006	-0.091	0.227	-0.22	0.177	0.37	-0.358	0.032	-0.019	-0.02	0.012	-0.13	0.195	-0.224	-0.065	.820**	.781**	.736**	1																				
Zimbardo Time Perspective (ZTPI)																																														
27	Past Positive	-0.225	-0.004	0.236	-0.262	0.139	-0.021	0.163	0.141	0.08	0.141	-0.005	0.224	0.286	-0.329	0.095	-0.144	0.152	-0.189	0.147	-0.059	0.168	0.329	0.459	.488*	0.428	.591*	1																			
28	Past Negative	0.157	0.323	-0.088	0.049	-0.304	-0.458	-0.276	-0.069	-0.233	-0.311	-0.049	-0.285	-0.146	0.142	-0.327	-0.181	-0.289	0	-0.178	-0.27	-0.017	-0.207	-0.442	-.677**	-0.381	-.633**	-.486*	1																		
29	Present Hedonistic	0.028	-0.196	0.245	-0.262	-0.259	-0.087	-0.38	-0.258	-0.298	-0.282	-0.129	-0.326	0.201	-0.212	-.587*	-0.473	-.583*	-0.068	-.546*	-0.31	-0.337	-.647**	-0.072	-0.217	-0.096	-0.156	-0.147	0.339	1																
30	Present Fatalistic	0.462	-0.144	0.314	-0.29	-.708**	-0.333	-.733**	-.677**	-.569*	-.539*	-0.237	-.497*	0.324	-0.307	-.767**	-.643**	-.769**	-.540*	-.547*	-.593*	-0.182	-.621**	-0.275	-.597*	-0.119	-0.375	-0.275	.534*	.588*	1															
31	Future	-0.135	0.075	0.217	-0.182	-0.102	0.04	-0.143	-0.269	-0.202	0.183	-0.312	0.195	0.357	-0.338	-0.094	-0.059	-0.225	0.312	-0.384	0.172	-0.443	-0.278	0.132	0.303	.516*	0.398	0.003	-0.044	-0.299	-0.148	1													
32	Balanced Time Perspective	0.332	0.057	-0.038	0.045	-0.389	-0.29	-0.43	-0.317	-0.331	-0.401	-0.087	-0.356	-0.075	0.097	-0.388	-0.268	-0.422	-0.11	-0.291	-0.362	-0.074	-0.395	-.551*	-.689**	-0.397	-.698**	-.732**	.826**	0.427	.752**	-0.113	1											
Personal and Organizational Quality Assessment - Revised 4 (POQA-R)																																														
33	Emotional Vitality	-0.107	-0.243	0.158	-0.172	0.146	0.248	0.091	0.15	0.056	0.144	-0.044	0.161	0.301	-0.322	-0.123	-0.179	-0.226	0.218	-0.323	0.101	-0.345	-0.266	.512*	0.46	.640**	.698**	0.332	-0.406	0.185	-0.323	0.353	-.606*	1										
34	Organization Stress	0.247	0.131	-0.063	0.11	-0.257	-0.356	-0.232	-0.095	-0.247	-0.223	-0.109	-0.197	0.004	0.061	0.086	0.037	0.121	-0.112	0.193	-0.141	0.253	0.177	-0.082	-0.324	-0.12	-0.211	-0.128	0.279	-0.323	0.179	-0.015	0.286	-.646**	1									
35	Emotional Stress	-0.019	0.233	-0.125	0.115	-0.219	-0.202	-0.174	-0.127	-0.231	0.103	-0.277	-0.354	-0.217	0.224	-0.272	-0.053	-0.263	0.16	-0.328	0.012	-0.312	-0.238	-.632*	-0.466	-0.423	-.638**	-.666*	.686*	0.12	0.271	0.199	.689*	-0.42	0.178	1								
36	Physical Stress	0.086	0.295	0.093	-0.097	-0.246	-0.368	-0.184	-0.197	-0.276	0.138	-0.341	-0.139	0.072	-0.067	-0.095	-0.084	-0.182	-0.046	-0.202	-0.146	-0.104	0.06	-0.119	-0.17	-0.075	-0.153	0.063	0.374	-0.132	0.146	0.461	0.184	-0.163	0.294	.659*	1							
37	Emotional Buoyancy	-0.131	-0.278	0.085	-0.089	0.189	0.257	0.106	0.166	0.083	0.039	0.038	0.214	0.249	-0.263	-0.154	-0.228	-0.259	0.303	-0.353	0.061	-0.352	-0.302	0.407	0.407	.663**	.636**	0.24	-0.363	0.182	-0.281	0.348	-0.42	.968**	-.624**	-0.4	-0.247	1						
38	Emotional Contentment	-0.067	-0.178	0.256	-0.262	0.078	0.241	0.061	0.114	0.014	0.263	-0.146	0.08	0.34	-0.367	-0.075	-0.102	-0.166	0.092	-0.257	0.141	-0.307	-0.199	.597*	.484*	.652*	.712**	0.414	-0.421	0.175	-0.344	0.326	-.663*	.949**	-.617**	-0.407	-0.043	.849**	1					
39	Pressures of Life	-0.057	0.402	-0.016	0.042	0.09	-0.368	0.047	-0.016	0.031	-0.138	0.11	0.2	-0.062	0.094	0.363	0.159	0.404	0.077	0.438	-0.042	0.417	0.383	-0.144	-0.064	-0.277	-0.214	0.082	0.236	-0.287	0.058	0.022	0.187	-.684**	.722**	0.072	0.267	-.680**	-.627**	1				
40	Relational Tension	0.437	-0.135	-0.071	0.106	-0.442	-0.213	-0.377	-0.036	-0.367	-0.274	-0.199	-.531*	0.055	0.007	-0.243	-0.123	-0.225	-0.18	-0.136	-0.176	-0.023	-0.16	0.09	-0.417	0.094	-0.068	-0.305	0.226	-0.095	0.177	-0.104	0.24	-0.169	.664**	0.134	0.039	-0.129	-0.204	-0.011	1			
41	Anxiety/Depression	-0.019	0.376	0.062	-0.079	-0.233	-0.274	-0.18	-0.1	-0.205	0.024	-0.208	-0.368	-0.042	0.045	-0.134	-0.102	-0.159	0.118	-0.151	-0.192	-0.038	-0.079	-.579*	-0.475	-0.323	-.602*	-0.43	.610**	-0.022	0.247	0.23	.524*	-.486*	0.309	.918**	.709**	-.497*	-0.424	0.217	0.152	1		
42	Anger/Resentment	-0.017	0.109	-0.245	0.239	-0.187	-0.13	-0.152	-0.133	-0.226	0.148	-0.298	-0.308	-0.318	0.328	-0.342	-0.013	-0.309	0.173	-0.419	0.155	-0.474	-0.326	-0.444	-0.413	-0.451	.666*	.687*	.641*	0.208	0.261	0.157	.527*	-0.332	0.067	.969**	0.397	-0.29	-0.354	-0.057	0.109	.762**	1		
43	Fatigue	-0.046	0.211	-0.057	0.039	-0.054	-0.207	-0.057	-0.046	-0.214	0.322	-0.385	-0.02	-0.018	0.025	0.062	0.031	-0.046	0.12	-0.161	0.013	-0.155	0.154	-0.059	-0.043	0.002	-0.034	0.118	0.243	-0.164	-0.022	0.477	0.072	-0.098	0.312	.694*	.949**	-0.179	0.012	0.303	0.022	.622**	0.353	1		
44	Health Symptoms	0.204	0.357	0.201	-0.212	-0.404	-.497*	-0.3	-0.313	-0.297	-0.058	-0.253	-0.233	0.143	-0.142	-0.234	-0.18	-0.286	-0.202	-0.207	-0.284	-0.032	-0.022	-0.182	-0.286	-0.145	-0.258	0.009	0.475	-0.095	0.289	0.392	0.273	-0.209	0.247	.688*	.947**	-0.288	-0.092	0.207	0.053	.716**	0.39	.797**	1	
45	Intention to Quit	0.359	-0.005	0.271	-0.272	-.629**	-0.362	-.561*	-0.285	-0.392	-.542*	-0.073	-.687**	0.225	-0.202	-.598*	-0.404	-.560*	-0.358	-0.352	-.518*	-0.037	-0.468	-0.227	-.542*	-0.114	-0.362	-0.332	.516*	0.376	.547*	-0.261	0.473	-0.187	0.273	0.34	0.117	-0.174	-0.185	-0.221	.669**	0.367	0.287	-0.071	0.291	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

activity, the lower the reported negative health symptoms such as physical tension, headaches, rapid heartbeats, aches, and pain.

3-min Stress Prep HRV and SOC

A significant positive correlation was found between 3-min Mean Heart Rate and Meaningfulness ($r = .627$, $p < .01$), as well as a negative correlation between 3-min Mean Inter-Beat Interval and Meaningfulness ($r = -.627$, $p < .01$).

3-min Stress Prep HRV and ZTPI

HRV and Present Hedonistic. Four 3-min HRV measures were found to have negative relationships with Present Hedonistic: SDNN ($r = -.557$, $p < .05$), LnTP ($r = -.583$, $p < .05$), LnLF ($r = -.546$, $p < .05$), and NC ($r = -.647$, $p < .01$). These results indicate that the higher scores in these HRV measures via the use of the HeartMath emotion-focusing techniques, the lesser the participants would either take risks or enjoy the present moments.

HRV and Present Fatalistic. Seven 3-min HRV measures were found to have negative relationships with Present Fatalistic: SDNN ($r = -.767$, $p < .01$), LnRMSSD ($r = -.643$, $p < .01$), LnTP ($r = -.759$, $p < .01$), LnVLF ($r = -.540$, $p < .05$), LnLF ($r = -.547$, $p < .05$), LnHF ($r = -.593$, $p < .05$), and NC ($r = -.621$, $p < .01$). These results indicate that the higher scores in these HRV measures via the use of the HeartMath emotion-focusing techniques, the less likely the participants would experience fatalistic thoughts and feelings.

3-min Stress Prep HRV and POQA-R4

Significant negative correlations were found between three 3-min HRV measures and Intention to Quit: SDNN ($r = -.598$, $p < .05$), LnTP ($r = -.560$, $p < .05$), and LnHF ($r = -.518$, $p < .05$). These results indicate that participants with higher scores in these HRV measures via the use of the HeartMath emotion-focusing techniques, have lower intention to quit their jobs.

ZPTI and SOC

Balanced Time Perspective (BTP) and SOC. Significant negative correlations were found between BTP and three SOC measures: Comprehensibility ($r = -.551$, $p < .05$), Manageability ($r = -.689$, $p < .01$), and Total SOC ($r = -.698$, $p < .01$). These results indicate that participants with a balanced time perspective (lower DBTP scores) tend to have better overall sense of coherence, particularly higher capacity to comprehend and higher ability in identifying possible resources to manage stressful situations.

Past Positive (PP) and SOC. Significant positive correlations were found between PP and two SOC measures: Manageability ($r = .488$, $p < .05$), and Total SOC ($r = .591$, $p < .05$). These results indicate that participants with an ability to retrieve positive past memories tend to have a higher sense of coherence, in particular a higher ability in identifying possible resources to manage stressful situations.

Past Negative (PN) and SOC. Significant negative correlations were found between PN and two SOC measures: Manageability ($r = -.677$, $p < .01$), and Total SOC ($r = -.633$, $p < .05$). These results indicate that participants with less negative past memories

tend to have a higher sense of coherence, in particular a higher ability in identifying possible resources to manage stressful situations.

Present Fatalistic (PF) and SOC. A significant negative correlation was found between PF and Manageability ($r = -.507$, $p < .05$), indicating that participants with a lower level of believing that the future is predestined or have no influence over future outcomes tend to be better at identifying possible resources to manage stressful situations.

Future and SOC. A significant positive correlation was found between Future and Meaningfulness ($r = .516$, $p < .05$), indicating that participants with higher concern for future consequences tend to have higher capacity to perceive that life makes sense, and stressful situations are worthy of commitment.

ZPTI and POQA-R4

Balanced Time Perspective (BTP) and POQA-R4. Significant negative correlations were found between BTP and two POQA-R4 measures: Emotional Vitality ($r = -.505$, $p < .05$) and Emotional Contentment ($r = -.563$, $p < .05$), indicating that participants with a balanced time perspective (lower DBTP scores) tend to experience increased level of positive emotional energy, including feelings of contentment, and inner peace. On the other hand, significant positive correlations were found between BTP and three POQA-R4 measures: Emotional Stress ($r = .559$, $p < .05$), Anxiety/Depression ($r = .524$, $p < .05$), and Anger/Resentment ($r = .527$, $p < .05$). These results indicate that participants with a balanced time perspective (lower DBTP scores) tend to experience decreased level of negative emotions, including the feelings of anxiety, sadness, anger, and/or resentment.

Past Positive (PP) and POQA-R4. Significant negative correlations were found between PP and two POQA-R4 measures: Emotional Stress ($r = -.555$, $p < .05$), and Anger/Resentment ($r = -.587$, $p < .05$). These results indicate that participants with higher level of PP tend to experience decreased level of negative emotions, including the feelings of anger, and resentment, and difficulty in emotional control.

Past Negative (PN) and POQA-R4. Significant positive correlations were found between PN and four POQA-R4 measures: Emotional Stress ($r = .605$, $p < .05$), Anxiety/Depression ($r = .610$, $p < .05$), Anger/Resentment ($r = .541$, $p < .05$), and Intention to Quit ($r = -.516$, $p < .05$). These results indicate that participants with higher level of PN tend to experience elevated level of negative emotions, including the feelings of anxiety, sadness, anger, and resentment, and the intention to quit their jobs.

Present Fatalistic (PF) and POQA-R4. A significant positive correlation was found between PF and Intention to Quit ($r = .547$, $p < .05$), indicating that participants with higher level of believing that the future is predestined or have no influence on future outcomes tend to have the intention to quit their jobs.

SOC and POQA-R4

Total SOC and POQA-R4. Significant positive correlations were found between Total SOC and three POQA-R4 measures: Emotional Vitality ($r = .698$, $p < .01$), Emotional Buoyancy ($r = .636$, $p < .01$), and Emotional Contentment ($r = .712$, $p < .01$). These results indicate that participants with higher level of SOC tend to experience increased level of positive emotional energy, including feelings of optimism, contentment, and inner peace. Significant negative correlations were found between Total SOC and three

POQA-R4 measures: Emotional Stress ($r = -.618$, $p < .01$), Anxiety/Depression ($r = -.602$, $p < .05$), Anger/Resentment ($r = -.566$, $p < .05$). These results indicate that participants with higher level of SOC tend to experience decreased level of negative emotions, including the feelings of anxiety, sadness, anger, and/or resentment.

Comprehensibility and POQA-R4. Significant positive correlations were found between Comprehensibility and two POQA-R4 measures: Emotional Vitality ($r = .512$, $p < .05$), and Emotional Contentment ($r = .597$, $p < .05$), indicating that participants with an enhanced level of understanding the stressful situation tend to experience increased level of positive emotional energy, including feelings of contentment and inner peace. Significant negative correlations were found between Comprehensibility and two POQA-R4 measures: Emotional Stress ($r = -.532$, $p < .05$), and Anxiety/Depression ($r = -.579$, $p < .05$), indicating that participants with an enhanced level of understanding the stressful situation tend to experience decreased level of negative emotions, including the feelings of anxiety and sadness.

Manageability and POQA-R4. A significant positive relationship was found between Manageability and Emotional Contentment ($r = .484$, $p < .05$), indicating that participants with a higher capacity to identify possible resources to manage stressful situations tend to experience feelings of contentment and inner peace. A significant negative relationship was found between Manageability and Intention to Quit ($r = -.542$, $p < .05$), indicating that participants with a higher capacity to identify possible resources to manage stressful situations tend to have lower intention to quit their jobs.

Meaningfulness and POQA-R4. Significant positive correlations were found between Meaningfulness and three POQA-R4 measures: Emotional Vitality ($r = .640$, $p < .01$), Emotional Buoyancy ($r = .663$, $p < .01$), and Emotional Contentment ($r = .552$, $p < .05$), indicating that participants with an enhanced level of understanding the stressful situation tend to experience increased level of positive emotional energy, including feelings of optimism, contentment and inner peace.

3.5 MANCOVA Analysis

A multivariate analysis of covariance (MANCOVA) using the pre-test scores as covariates was performed on several measures that were significantly different between the groups (HMS and WLG) on the post-tests (e.g., SOCMA), as revealed by the interactions from the MANOVAs. These MANCOVAs compared the groups on the post-test differences when the pre-test scores were entered as covariates. The results showed the differences on the post-tests scores were still significant after adjusting for differences on the pre-test scores.

4 Discussion on Findings

4.1 Research Question One

Recent research has concluded that HRV is a primary non-invasive tool that can be used to accurately measure workplace stress (Low and McCraty 2018), as well as a valid physiological indicator of emotional experiences and a valid measure of neurocardiac

function that reflects heart-brain interfaces and ANS dynamics (McCraty et al. 2009). HRV has been considered to be a strong independent predictor of future health and resilience (McCraty 2017; McCraty and Atkinson 2012). Additionally, the POQA-R4 (Institute Of HeartMath 2011) is a subjective self-reported stress questionnaire designed by IHM, also an empirically validated and normed assessment, which has been used to measure psychological health, physical stress symptoms, emotional competencies, resilience, and organization quality. The quest of this study, as guided by this research question was to examine how well, if any, would the practice of HeartMath coherence-building techniques over 13 days, drive measurable increases in HRV coherence as a physiological measure, and POQA-R4 scores as a psychological measure.

While most findings in this section were consistent with previous studies (e.g., McCraty and Atkinson 2012; Sarwari and Wahab 2018a), some mixed results have also been observed. For instance, a study demonstrated that the resting HRV of a group of high school students was found to have a significant increase after practicing the HeartMath emotion self-regulation and coherence-building techniques over four months (Bradley et al. 2010). One contrary outcome between this study and the current one was the between-groups significance difference in the HF scores, where the univariate tests in the current study did not show any interaction effect in both 5-min resting HRV ($p =$ .664) and 3-min stress prep HRV ($p =$. 227) as compared to the study mentioned above, $p = .001$. Instead of an expected increase in HF (parasympathetic activity) as observed in the above study as well as several other studies (e.g., McCraty and Atkinson 2012; Sarwari and Wahab 2018a), the current study showed reductions in HF scores for both 5-min and 3-min HRV measures.

This interesting finding, the researcher argued, can be explained with support from other researchers who also observed this phenomenon. For instance, the LF scores in the current study were significantly higher, which is also consistent with most studies using the HeartMath System (e.g., McCraty and Atkinson 2012; Sarwari and Wahab 2018a). According to research, the LF is a mixture of both autonomic inputs (Ernst 2017; Sztajzel 2004; Task Force 1996). Shaffer et al. (2014) asserted that the SNS does not appear to generate rhythms much above 0.1 Hz, whereas the PNS can produce heart rhythms down to 0.05 Hz, which may be aligned with early research suggesting that the PNS contributes to at least 50% of the LF variability while the SNS, at best, basically contributes 25% to this variability (Randall et al. 1991). Porges (2007) also posits when individuals perform slow-paced breathing at the resonance frequency (0.1 Hz, 10-s rhythm or six breaths per minute), the LF band encompasses the aggregated influence of both myelinated and unmyelinated vagal pathways on the heart, reflecting total cardiac vagal tone. All these are in line with a consultation with Dr. Rollin McCraty, Director of Research with the Institute of HeartMath (Personal communication, 15 November, 2019) where he indicated that there is an increased power in the LF scores and typically decreased power in the HF and VLF scores when a person is in a coherent state. He added that the decreased HF scores become less of an issue as the vagally mediated HRV activity has apparently elevated, in which the frequency of this vagally mediated activity has simply shifted into the LF band. Hence, with the current study that has an observed increase in LF pre- and post-test scores for the 5-min resting HRV (23%) and 3-min stress prep HRV

(25%) in the HMS group, the results suggest an association with flexibility, psychological well-being, and good performance (McCraty and Shaffer 2015).

The phenomenon can also be explained with the enormous increase in the LF/HF Ratio in the pre- and post-test scores for both 5-min resting HRV (289%) and 3-min stress prep HRV (200%) in the HMS group compared to the decreased scores in the WLG group with -54% for the 5-min and -68% for the 3-min HRV measures. Although an increase in this ratio has often been interpreted to suggest an increase in sympathetic activation, as proposed by McCraty and colleagues (2009), a different interpretation is warranted in the light of the coherence-building intervention used in this study. As stated by McCraty (2019) in the above communication, while the increase in LF/HF Ratio could be misinterpreted as a considerable elevation in sympathetic activity in this case, it is predominantly due to an increase in parasympathetic activity and vascular resonance (Tiller et al. 1996). With that, the researcher in this study proposes that immense elevation in the LF/HF Ratio in the HMS group most likely reflects an overall increase in heart rhythm coherence and parasympathetic activity. These were achieved through the use of the coherence-building techniques and biofeedback technology, consistent with earlier research that demonstrated the increased power in LF scores led to significant increases in gratitude and positive outlook after the intervention (McCraty et al. 1995; Tiller et al. 1996; Bacon et al. 2004).

While significant group differences were shown for the HRV findings, the pre to post-test scores changes in self-reported POQA-R4 did not reach significance for group differences, and there were no significant improvements in increasing vitality and reducing stress. These findings, in the context of observed significant improvements in the pre- and post-test scores, were not consistent with the studies conducted with police officers (Weltman et al. 2014) and healthcare leaders (Lackey 2014). It is imperative to note that there was varied duration of the intervention period in these studies compared to the current one, where the police officers went through a practice period over six weeks, and the healthcare leaders had a six-month time frame, versus 13 days for the current study. However, it is noteworthy to discuss that despite the fact that POQA-R4 did not show multivariate condition x time interaction ($p = .402$), a considerable magnitude of the effect size ($\eta p2 = .420$) was observed, and cannot be overlooked. Like the studies mentioned above (Lackey 2014; Weltman et al. 2014), the HMS group has also demonstrated the desired changes, where improvements were observed in all four primary scales and eight of the nine subscales compared to the WLG group. There was an apparent reduction in the domain that measured stress, such as emotional stress, organizational stress, physical stress that impede performance, and an increase in the domain that measured emotional vitality that improves performance.

A notable mention is that there was a univariate condition x time interaction for Relational Tension, indicating that there was a significant improvement in relationships and communication within their social circles. This is consistent with the polyvagal theory that high HRV activates the ventral vagus complex (VVC), a higher-level and newer neural system that enables people to relate with other people openly and engagingly, as well as acquire effective emotion regulation (Porges 2011). Additionally, as presented in Table 2, participants in the HMS group had only a slight increase of the pre- and post-test scores in the stress scale (2%) and the intention to quit (5%) as compared to the

WLG group 5% and 13% (statistically significant), respectively. The results suggest that participants in the HMS group were able to regulate their emotions more effectively than the WLG group, perhaps by seeking social support in the workplace, which is related to the decrease in the Relational Tension scores.

In conclusion, these results suggest that in the face of stressful events the participants in both groups may encounter during the study period, the HMS group was more likely to have the ability to self-regulate where they were able to achieve a calm, balanced, yet energized and responsive state "in the moment" by using the HeartMath system to increase emotional energy, vitality, contentment, peacefulness, buoyancy, relationships, and communication. There was also a reduction in distress, fatigue, anger, sadness, and physical stress symptoms. Moreover, the physiological findings revealed in the HRV analysis have supported these psychological outcomes that the practice of the HeartMath system over a short duration of 13 days can increase psychophysiological coherence. Participants in such a state would experience a reduction in the depletion of emotional energy that impedes performance; and would experience an improvement in emotion-regulation, flexibility in adapting to stressful situations, and renewing of emotional energy reserves available for work and personal life. These are results of learning strategies that facilitate the establishment of a new, healthier internal baseline reference, as demonstrated in the 5-min resting HRV measures, and participants have shown to mature through this process as they can more effectively self-regulate their emotions and navigate new situations or challenges as conclusively shown in the 3-min stress prep HRV measures. All of which are essential keys to building resilience.

4.2 Research Question Two

Literature has considered SOC as a resilient factor (Braun-Lewensohn et al. 2017) and individuals with high SOC scores are positively associated with high health-promoting scores, and they are less likely to perceive stressful situations as anxiety aggravating and threatening than individuals with low SOC scores (Suraj and Singh 2011). The objective of this study, as guided by this research question was to examine how well, if any, would the practice of HeartMath coherence-building techniques over 13 days lead to measurable increases in SOC scores.

The huge effect size in this study that is comparable to the study conducted by Field and colleagues (2018) suggests the large treatment effect of the HeartMath coherence-building program on participants' total SOC. While significant difference has been found in the Total SOC scores, it is imperative to determine which of the SOC components may facilitate the improvement of SOC from a short duration of intervention period. With this intention to investigate further using the MANOVA analysis, only SOCMA was found to have a significant condition x time interaction.

According to SOC researchers, manageability is the instrumental/behavioral component, which represents the confidence that resources are available for one to meet environmental demands. This is a result of experiencing between environmental demands and available resources (Antonovsky 1987; Lindstrom and Eriksson 2005, 2006). These descriptions suggest that during the 13-day study period, participants in the HMS group were more likely to find possible resources to help them to deal with their stressful situations. The researcher posits that this favorable outcome may be attributed to the

introduction of a set of self-regulation methods (a generalized resistance resource which underpins the development of a strong SOC), and the recommendation of specific emotion regulation techniques and the use of the biofeedback technology (specific resistance resources that are situation-specific; Antonovsky 1987). These are internal resources that were developed during the 13-day period that can be particularly useful during the absence of any external resources (e.g., social support) that can prevent tension from being transformed into stress. An example to describe such a situation is: a participant can immediately use the emotion-refocusing breathing technique (e.g., Quick Coherence or Freeze-Frame) taught by the researcher when one is feeling highly anxious ten minutes before a presentation to the company's most important client. The participant would have the specific skill to prepare oneself before the presentation and may even be able to do self-regulation "in-the-moment" during presenting. This demonstrates that the participant has successfully coped with the stressful event, which provides a platform for one to attain resilience and health.

In this study, the comprehensibility and meaningfulness components did not reach statistical significance. The researcher supposes that the 13-day study period may be too short for the participants to acquire a certain level of insights to perceive the world objectively or to see the value or learning opportunity in the current situation. Nevertheless, the mean scores for the three SOC components have shown a slight upward trend in the HMS group (3% increase in comprehensibility; 19% increase in manageability; and 0% in meaningfulness) as compared to a largely downward fashion in the WLG group (1% increase in comprehensibility; 2% decrease in manageability; and 4% decrease in meaningfulness). Overall, a multivariate condition x time interaction for all SOC scores was observed. This confirms with evidence the positive effects the HeartMath System had on obtaining a high sense of SOC, which is an important mechanism underpinning the development of stress-related resilience and health (Mc Gee et al. 2018).

4.3 Research Question Three

Numerous studies have considered the Zimbardo Time Perspective Inventory (ZTPI) as a crucial psychological variable associated with plenteous areas of human functioning, such as subjective well-being, health behaviors, risky behaviors, and propensity to become addicted, (Carelli et al. 2008; Zhang and Howell 2011; Zimbardo and Boyd 1999, 2008). The purpose of this study, as guided by this research question was to investigate how well, if any, would the practice of HeartMath coherence-building techniques over 13 days facilitate a balanced time perspective, as indexed by the Deviation from the Balanced Time Perspective (DBTP: Stolarski et al. 2011) based on the ZPTI scores.

While the concept of balanced time perspective (BTP; Zimbardo and Boyd 2008) has been utilized to explain its relationship with emotional intelligence, gratitude, mindfulness, stress, self-control, well-being (Brown 2017; Drake et al. 2008; Ronnlund et al. 2019; Stolarski et al. 2011; Szczesniak and Timoszyk-Tomczak 2018), and sense of coherence (Ruzhytska 2015; Wiesmann et al. 2018), this study may be among the first to examine its association with the effects of HeartMath System. Although there may be an absence of studies examining how the HeartMath System affects BTP, the researcher chose studies that focused on mindfulness practice and BTP (e.g., Ronnlund et al. 2019), given the comparable nature that the techniques used are centered on self-regulation "in

the here-and-now." However, it is imperative to note the slight differences between mindful meditation and one of the HeartMath breathing techniques (e.g., Heart Lock-In), such as the active stance in sustaining a non-judgmental attitude towards one's thoughts and feelings (Kabat-Zinn 2005) in the former, and actively generating a sincere attempt to re-experience a renewing emotion (e.g., appreciation, care) in order to sustain heart coherence, and to radiate that energy to the self and others (Institute of HeartMath 2014).

Ronnlund and his colleagues (2019) investigated whether mindfulness promotes a more balanced time perspective in two mindfulness training groups ($n = 69$). Findings showed significant reductions in the combined data for pre and post DBTP scores, with lowered scores on PN and PF, and a small increase on PP. However, no difference was found for PH and FP (Ronnlund et al. 2019). Consistent with the previous study, the current study has also shown a dramatic decrease in the pre and post DBTP scores for the HMS group comparing to the WLG group, as demonstrated in a condition x time interaction. There was also significant reduction in PN, and PF. Similarly, there was no pre- and post- intervention difference for PH and F. However, PP did not reach any statistical difference. In these two studies, it is essential to note the small to medium effect sizes, as shown in the mindfulness study, while the current study portrayed large effect sizes. Moreover, a medium effect size was observed on the time perspectives that did not show statistical significance. These results suggest that the HeartMath System is not only shown to be effective in reducing time perspective biases, thus improving a balanced time perspective, but it may also have a larger treatment effect than the mindfulness training program, as demonstrated in the study mentioned above.

Most findings in this study were as expected. The researcher predicted that participants in the HMS group would experience a reduction in PN and PF due to the use of the emotion-refocusing techniques (e.g., Heart-Focused breathing, Quick Coherence, Freeze Frame) that were designed to help participants to reset and shift away from the negative thoughts and emotions. Along with the conscious regulation of one's respiration at a 10-s rhythm, this process sets a stage for participants to have the space to increase heart coherence, which allows one to shift into a more coherent state. It was surprising to learn about the insignificant finding of PP because self-generation of positive emotions (retrieving positive aspects of one's past) is the crucial ingredient of the HeartMath breathing techniques that helps participants to sustain higher levels of coherence for a much longer duration.

Despite these findings, the mean PP scores in the HMS group have shown slight increase at post-test as compared to the decreased mean PP scores in the WLG group. The same trend was observed in the mean Future scores for both groups, which were also found to be insignificant. To address these findings, it is worthwhile to revisit the ideal time perspective chart (Zimbardo and Sword 2017), where the ideal PP is 3.67, and the Future is 3.69. As revealed in these mean scores, it is apparent that the mean scores for both groups were very close to the ideal scores. This might explain that the participants in both groups could already have the ability to re-experience positive past memories and plan for the future. Nevertheless, the results demonstrate a desired directional change in both PP and F scores for the HMS group.

As for the decrease in the mean scores for PH (the ability to enjoy the present moment), which is also far below the ideal score of 4.33, the researcher posits that the

participants might be trying to cope with some very stressful moments during the study period instead of having time to do enjoyable things. It is also interesting to note the higher pre-test mean scores for PN and PF in the HMS group, despite the fact that they also scored slightly higher in PH and F. This might explain why the mean DBTP score is also higher in the HMS group at pre-test. However, considering all other time perspectives, the HMS group has demonstrated a higher ability in downregulating PN and PF while still maintaining relatively high PP and F scores with a slight increase. The findings showed that they possess better flexibility in switching temporal focus; thus, there is a significant increase in a balanced time perspective, which is key to well-being and resilience, both short- and long-term.

4.4 Research Question Four

The favorable findings in the above three research questions have shown the effectiveness of the HeartMath System on HRV, POQA-R4, SOC, and BTP, in their own rights. Echoing Bischof's (2008) postulation that all systems in the organism must be coherent, balanced, ordered, harmonious, and integrated to a certain degree to be functional, the researcher is interested in examining further and desires to determine a more holistic view of what predicts emotion regulation flexibility. The focus should not be limited to one specific theoretical framework or paradigm, but to integrate research-based theories and interventions that add value to the current literature. With that, this research question has attempted to examine what are the factors that may improve emotion regulation flexibility, commencing with the several frameworks that have been researched in this study.

In the current study, what stood out in the results as revealed in the 5-min resting HRV measures was that participants who scored high in these measures tend to have lower tendency of believing that everything is predestined and they have no power to change their future, fewer complaints on having negative health symptoms (e.g., physical tension, pain), and lower intention to quit their jobs. The results in the 3-min stress prep HRV measures have established that by using the new self-regulation skills learned in this study (e.g., Quick Coherence, Freeze Frame), participants also have a lower tendency to hold fatalistic thoughts and feelings about the future, and a lower intention of leaving their jobs. What is interesting is the positive relationship between the Mean Heart Rate and Meaningfulness in SOC. The higher mean heart rate, which is commonly associated with lower HRV, may be seen as participants striving to achieve challenging goals, which they may perceive as worthy of their commitment. However, this result may be counter-intuitive to the negative relationship between 3-min HRV measures and PH, where the participants who have high HRV were less likely to take risks or enjoy the present moments. This can be viewed as two sides of the same coin – participants were careful with proceeding with their work because it was a vital task, and they wanted to avoid any failure, or they were doing a task they did not really enjoy, but the reward was highly worthwhile. Hence, the findings revealed that obtaining a high HRV has positive effects on stress management, sense of coherence, and time perspectives.

Participants with a more balanced time perspective, particularly an increase in PP and F, and a decrease in PN and PF were found to have a better overall sense of coherence. The results showed that they were able to have a higher capacity to gain insights about the

situation, better at identifying possible resources to help them to overcome the situation, and were more likely to view stressful situations as worthy of commitment. Additionally, participants with higher BTP also tend to experience an increase in positive emotional energy, including feelings of inner peace and contentment. They would also experience lower emotional stress, including feelings of anxiety, sadness, anger, resentment, and a lower intention to quit their jobs. Likewise, the positive relationships found between SOC and POQA-R4 also demonstrated an increase in emotional vitality and a decrease in all stress measures. Fundamentally, these results have shown that factors that are essential to emotion regulation flexibility are interrelated. This suggests that regular practice in making a sincere attempt to self-generate a positive feeling, along with 10-seconds breathing not only can increase their psychophysiological coherence, but also allow individuals to flexibly adapt between the temporal frames, and be able to see their future as predictable, manageable, and meaningful. All these suggest a new inner baseline reference can be established where individuals can intuitively use the HeartMath self-regulation techniques to make more intelligent decisions by aligning their heart intelligence in the face of demanding circumstances.

5 Limitations

There are various shortcomings within the study. The first limitation in the study was the small sample size, even though a sample size required for the study of around 14 to 17 participants was fulfilled without much attrition. However, several other limitations emerged as the study progressed. The lack of diversity may be a factor in this research, as most participants in the research were Chinese. Although the homogeneous ethnicity may not be a confounding factor on HRV which is an objective measurement of stress and physiological coherence, it would have larger effects on the three self-reported questionnaires that may limit generalizability of the study findings to a diverse population in Singapore. Also, the aggregate data obtained through the self-reported questionnaires in this study, including the POQA-R4, SOC, and ZTPI, may not wholly represent participants' feelings, attitudes, or behaviors which may be attributed to the tendency for them to respond in a socially acceptable manner, demonstrating a social desirability bias. Before or during the study period, participants may have gone through high intense difficulties such as bereavement and loss or difficult relationship with a family member or a colleague.

Another limitation pertaining to the self-reported questionnaire is the wordings that were reflected in the POQA-R4. In this questionnaire, participants were required to respond to the questions based on how they think or feel during the last month. As the same questionnaire was used for both pre-and post-test sessions, the responses based on how they think or feel during the last month could not accurately measure how the participant feels on the very day. Hence, the researcher recommends the use of "now" instead of "last month." After all, this study was set to examine state instead of trait.

Having mentioned HRV as an objective measurement, several confounding variables might have been unavoidable. For instance, the difference in HRV readings from participants due to assessments which were conducted at different times of the day. As the two exclusions for the current study was age and having existing heart condition, participants

were not required to report whether they are on medication (e.g., for high cholesterol or diabetes) which might reflect a reduction in HRV.

It is also imperative to note that the intervention period in this study was too short, even though the findings were predominantly significant. It was also anticipated to have problems in getting participants to commit to the initial intended six weeks' study, because the study period was near the end of the year when many people may be planning for overseas trips. Hence, the choice of conducting a brief 13-day study period was due to these resource constraints.

6 Implications for Professional Practice

In this study, there were large effect sizes that were observed in HRV, POQA-R4, SOC, and ZPTI through a brief 13-day practice of the HeartMath System. These simple and practical breathing techniques and the use of biofeedback technology are tools that have helped individuals to down-regulate stress and up-regulate positive emotions. This study has provided individuals a road map on how they could achieve personal-well-being by simply go back to the basics – breathe, tune, and synchronize their ANS. Hence, the findings in this study have shown that the HeartMath System not only can be considered a single-component intervention, but also an adjunctive therapy for several rehabilitation programs (e.g., chronic pain, addiction, recurrent migraine), given the demonstrated efficacies in reducing stress, negative health symptoms, relational tension; and improving mood, energy, sense of coherence, and social relationships. Practicing clinicians may use the outcomes of this study as an add-on to their clinical work, clinical supervision, and training programs.

Private or government schools could consider integrating the HeartMath System with their current social and emotional learning (SEL) programs, where the key domains of social and emotional skills, such as self and social awareness, self and relationship management, and responsible decision making can be strengthened. Additionally, cooperate organizations could utilize the HeartMath System to integrate into their existing wellness and performance improvement initiatives. Because their staff would have the skills to manage stress response "in-the-moment," they are more resilient and could respond with more presence, flow, flexibility, and connection. Such dynamics would generate a more collaborative working environment, which would result in higher staff retention. Hence, the HeartMath System is potentially expedient for the development and delivery of 21st-century health services and public health programs.

7 Conclusions

Findings in this study have demonstrated that vitality, resilience, and emotion flexibility can be achieved and sustained by generating an increase in psychophysiological coherence, which is embodied by increased synchronization between the activity of heart and brain. For instance, there were significant improvements in the LF power (5-min resting HRV and 3-minute stress prep HRV), which encompasses the aggregated influence of SNS and PNS and has also been associated with flexibility, psychological well-being, and good performance. Moreover, instead of accumulating allostatic load or completely

shutting down the SNS to reduce stress, the high LF effect allows the activation of regulation in the SAM and HPA axes, which have been found to inhibit the PNS and neurovegetative functions. Solely practicing on relaxation would not enable individuals to summon the energy needed to counter stressful situations intuitively. This is because coherence is not relaxation. Findings have further shown that even a brief period of practicing HeartMath interventions can yield positive effects on participants' BTP and overall SOC, both of which are essential psychological variables that represent references to one's internal time perspectives that may affect how individuals comprehend themselves as resourceful and view the world as meaningful.

In conclusion, the HeartMath System, as studied in this research, was consistent with the literature. The desired directional changes in both physiological and psychological data have shown measurable and sustainable improvements in personal health and performance. With that, this study has supported a research-based resilience-building program for Singapore agencies who work with either or both clinical and non-clinical populations. The HeartMath System consists of simple, practical techniques that Singaporeans can use "in-the-moment" and "on-the-go," helping them in building coherence and increasing emotion regulation flexibility towards resilience.

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The Effect of Fast Loans on Financial Resilience-Building Behaviors and Mental Well-Being

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Abstract. The OECD highlighted the importance of financial resilience for vulnerable households in the long term, beyond the COVID-19 crisis. That is so that negative consequences of limited resilience on mental health can be reduced as well. In behavioral economics, borrowing is a valuable means to enhance an individual's financial resiliency. However, in psychology literature, borrowing can be detrimental to one's mental health if the borrowers cannot repay their debts. This study examines the effect of fast loans on the resilience-building behaviors and mental welfare in a Southeast Asian economy, the Philippines. We deployed a mixed-methods analysis of social media content and a semi-structured interview with 10 Filipino residents in Luzon. We investigated their decision processes and behaviors, considering their savings, borrowing, risk management, and mental health. The findings showed that customers cope with their emergencies through fast loans but may encounter financial hardships while repaying - lowered savings and missed bills payments. We found that higher repayment rates are related to the experience of harassment and mental health issues using the Pearson chi-squared test. These experiences and the COVID-19 pandemic strengthened their risk-coping after paying their dues. Borrowers are more prepared for unseen risks–they are saving for the future and will choose better loans in case of emergencies. The findings motivated us to consider the customers' financial resilience in our prospective behavioral data model for loan offers. Furthermore, we recommend aggregating all loan details from legal and financial institutions into an accessible, easy-to-use loan portal–empowering borrowers with access to information to make an informed decision on the loan suitability.

Keywords: Financial resilience · Resilience-building behaviors · Fast loan · Mental well-being

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1 Introduction

In recent years, loan applications have become quicker and more accessible due to revolutionized finance and technology (Goldstein et al. 2019). It gave rise to fast loans–immediate access to short-term and higher interest rates credit with fewer documents (Zoleta 2021). This type of loan could be a double-edged sword: on the one hand they aid the borrowers' immediate needs but may inadvertently impact customers' financial and mental health during the repayment period. Zaki (2016) found that UK payday loans can improve borrowers' living standards by achieving a balance with their spending for necessities and savings for the future or impair their savings fund by purchasing non-essential goods in the present. Borrowers experienced financial challenges with loan repayment–hunger, rent problems, and utility bills payment (Szilagyiova 2015). Lower-income US households who took up loans experienced more financial hardships than support as they missed their bills payments for other loans and utilities due to accumulated debt (Melzer 2011).

Debt has been associated with lower mental well-being. In Richardson et al.'s (2013) meta-analysis of 52 studies, they found a strong relationship between financial hardships and reduced mental health: anxiety due to debt was susceptible to eating disorders, psychotic symptoms, and alcohol addiction. Indebted individuals are prone to have a mental health disorder three times than those who do not have debt - they had a mental illness, depression, suicide thoughts and attempts, drinking problems, dependence on drugs, neurotic disorder, and psychotic disorders (Richardson et al. 2013). Sweet et al. (2018) discovered that aside from anxiety issues, debt increased body mass index (BMI), waist circumference, C-reactive protein levels, and self-reported physical health and sexual health issues. Once borrowers pay off their debt, it results in reduced mental health-related problems. In UK's poor population, paid-off debts reduced exhibited anxiety and present bias by 11% and 10%, respectively (Ong et al. 2019).

In the Philippines, while fast loans facilities are readily available research on the topic is scarce. Thus, it is interesting to examine how Filipinos cope up given the Philippines has a challenging economy today- the country experienced an economic decline, with the 2020 GDP dropping to -9.5% (Venzon 2021). The Organization for Economic Co-operation and Development (OECD 2020) highlights the importance of financial resilience for vulnerable households because financial shocks can affect an individual's mental health even beyond the pandemic. In this paper, we examine the motivation for fast loan take-up and the impact these loans may have on consumers' resilience-building behaviors and mental health in the developing country's setup of the Philippines.

2 Methodology

2.1 Research Design

We used mixed methods to understand the effect of the loans on Filipinos' resilience-building behaviors and mental health. Furthermore, this method aims to compare findings from qualitative and quantitative methodologies. The technique is flexible - we can capture the participants' experiences and provide the complete details of the story (Wisdom and Creswell 2013).

For the first research approach, we gathered social media texts and used content analysis to uncover categories. This quantitative and qualitative technique interprets written, verbal, or visual communication information, e.g., social media posts and comments. It was defined as a "research method for the subjective interpretation of the content of text data" (Hsieh and Shannon 2005, as cited in Parveen and Showkat 2017).

Semi-structured interviewing, analyzed through thematic analysis, is the study's second and qualitative approach. It is "particularly good at enabling the researcher to learn, firsthand, about people's perspectives on the subject chosen as the project focus" (Davies 2007, p. 29 as cited in Ellis 2012, p.76). It can also obtain the extent of the participants' experiences (Ellis 2012). Qualitative research provides profound knowledge about a person's experience and gives "valuable insights into how people construct meaning in various social settings" (Neuman 2006, p. 308 as cited in Ellis 2012, p. 76).

Figure 1 demonstrates the convergence of the findings from both research approach employed in the study.

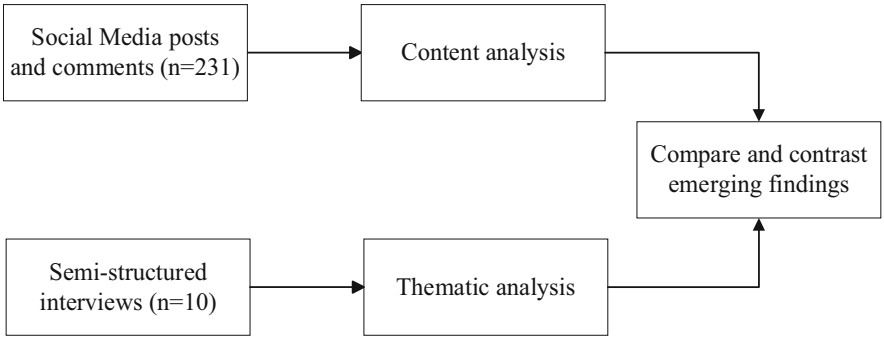

Fig. 1. The diagram showing the mixed methods design

2.2 Material

2.2.1 Constructing the Interview Questions

We used the popular Marketing theory of the consumer decision-making process. It covers the (i) problem recognition, (ii) information search, (iii) evaluation of alternatives, (iv) actual purchase, and the (v) post-purchase satisfaction or dissatisfaction (Stankevich 2017). Breaking down the decision-making processes behind fast loans can explain how borrowers considered their resilience-building behaviors and mental health to come up with a decision of taking up fast loans. Lyons et al. (2020) deconstructed the resilience-building behaviors into savings and risk mitigation (building emergency funds or getting insurance) and borrowing. Table 6 (appendix) shows the questions presented to the participants. We asked questions related to studies on human behavior, psychology, and debt and why people took up fast loans and other studies considering resilience-building behaviors. Figure 4 displays (appendix) the relationship of each factor to the consumer decision-making process.

Human behavior and psychology explained fast loans' effect on the customers' finances. In Sweden, Andric and Mooney (2013) found that personal factors and beliefs like education, intelligence, willpower, and time preferences affected consumers to take up fast loans and later repayment problems, e.g., financial hardships. Furthermore, Andric and Mooney (2013) elaborated that their low IQ, educational attainment, and weak financial self-control resulted in: i) burdens of managing monthly expenditures, ii) ignorance of the risks, economic situation, and total repayment costs (even if the message was transparent), and iii) uncontrolled take-up of other loans. Thus, we asked questions about their educational background and style on financial management to rate from a score of 1 to 10 their current financial literacy and control over the payment of their bills, and then we got their explanations. In the UK, lack of self-control and financial literacy led to an over-indebtedness due to the following reasons: borrowers often use store cards and payday loans and conduct risky financial behaviors—frequent money withdrawal, expenses on durables (Gathergood 2012). Those who experienced monthly spending difficulties have a present bias - looking more at their current desires than their future needs; if they used loans for their wants over needs, it would lead to financial problems and debt accumulation (Becker 2016). Andric and Mooney (2013) added that marketing materials highlighting easy and quick loan applications and approval swayed more people to take up fast loans. However, people who fell into debt can also go beyond personal flaws. Stress from debt itself impairs decision making leading to accumulated debt (Ong et al. 2019)**.** Hence, we asked if they experienced any mental health problems while repaying the loan they took up before asking about their financial situation after they used up the loan.

In asking the recruited borrowers' income classes, we used the income distribution published by Albert et al. (2020) (Table 1).

Table 1. Range of Filipino's Monthly Family Incomes (family size of n = 5 members) in 2018 prices

Income group	Range of family income per month, *in PHP (USD)*
Poor	Less than PHP 10,957 (USD225)
Low income (but not poor)	Between PHP 10,957 to PHP 21,914 (225 USD to 449 USD)
Lower-middle income	Between PHP 21,914 to PHP 43,828 (449 USD to 898 USD)
Middle-middle class	Between PHP 43,828 to PHP 76,699 (898 USD to 1,572 USD)
Upper-middle income	Between PHP 76,699 to PHP 131,484 (1,572 USD to 2,695 USD)
Upper income (but not rich)	Between PHP 131,483 to PHP 219,140 (2,695 USD to 4,492 USD)
Rich	At least PHP 219,140 (4,492 USD)

2.3 Data Collection

2.3.1 Collection of Social Media Posts and Comments

The researchers purposively sampled six Facebook group communities–subjective selection with these characteristics: (1) group name related to loans or lending, (2) with at least one thousand members, (3) created within the last three years.

We browsed each group and purposively selected posts, or comments related to fast loans. Table 2 shows the details of the six Facebook groups selected for the study. If the post or comment was deemed unrelated to the fast loan or only intended for a fast loan advertisement posted by loan agents, we moved to the next post or comment until we found a qualified text. For each Facebook group, we limited our browsing coverage of each group–with the average posts per last 28 days (publicly displayed on details of the group) as of August 21, 2021 - shown in Table 2. In total, we got a sample of n = 231 for all groups.

Table 2. Details of the Facebook groups selected for the study.

Group name on Facebook	Date created, *dd-mmm-yy*	Total posts in 28 days, *N*	Total texts sampled, *N (%)*
Cash loans online Philippines	24-Aug-17	10,000	2 (0.9%)
Loans (Cash Loan) Philippines PH	23-Mar-18	21,000	7 (3.0%)
Cash loan Philippines (Legit)	01-Jan-21	60	14 (6.0%)
Victims of online loan apps	09-Jul-21	520	42 (18.0%)
Petition to stop loan Shark and financing	07-Jun-20	1,100	85 (36.5%)
OLA* victims	07-Dec-20	1,280	83 (35.6%)
Total		33,380	231

* OLA – Online Lending Apps.

2.3.2 Semi-Structured Interview

The sample consisted of n = 10 employed Filipinos who took up at least one fast loan within 2018 to 2021. They were selected using a non-probabilistic, convenience sampling method – from the researchers' relatives, friends, and friends of friends. The researcher posted an announcement about the study via a Facebook timeline that potentially reached 1,402 people. For this study, a fast loan was defined as one that 1) had a quick process, less than 24 h 2) required few documents, 3) had higher interest rates 4) had less than one year term. Based on this, 7 of the 17 volunteers were dropped, leaving 10 who

have experienced taking up fast loans (See Fig. 2). Each of the interviewees had already settled their fast loans before their scheduled interview. The researchers asked about their current loans to assess if their perception towards loans (in general) changed after taking up fast loans. We exempted the poor since Operaña (2016) cited that poor Filipinos go to informal lenders because they lack proper identification credentials, which is a prerequisite for borrowing. Informal sources in the Philippines are their social ties: friends, neighbors, relatives, or 5–6 lenders, which can give them flexible loan amount and payment terms.

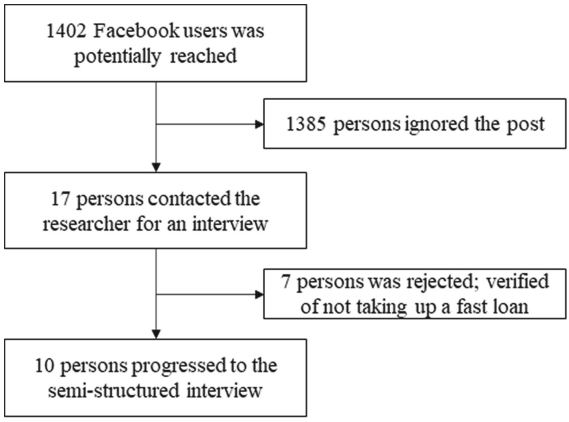

Fig. 2. The diagram shows the study recruitment through a social media site, Facebook.

We interviewed the recruited participants via (i) Zoom, (ii) Microsoft Teams, (iii) phone calls, or (iv) Facebook Messenger, depending on their preference. Before starting their respective interview, we repeated the research's purpose and their rights to answer some or all the questions. Then, we reaffirmed their consent verbally for audio-recording of their responses. To make the interviews conversational, we translated the questions from Table 6 (appendix) to Filipino or mixed Filipino and English language when we interviewed the participants. Thus, they freely expressed their answers using those languages too. After the interview, we transcribed their responses.

2.4 Data Analysis

In qualitative research, analysis can be either inductive or deductive. Inductive analysis infers the text codes or themes based on the data while deductive analysis uses pre-existing studies or theories to identify the text categories or themes. The researchers used the inductive method for the thematic and content analysis of social media texts. Kyngäs et al. (2020) suggested that inductive approach is an applicable method if no existing research has published a particular study–this case, on fast loans' effect on resilience-building behaviors and mental health in the Philippines.

2.4.1 Content Analysis

The researchers followed the inductive content analysis suggested by Kyngäs et al. (2020).

1. The researchers organized and familiarized themselves with the posts or comments.
2. We reduced the length of the text data by generating the main idea of each post or comment.
3. We grouped similar ideas.
4. Then, we formed concepts that will answer the research questions through abstraction: summarizing the raw data into subcategories, generic categories, and main categories and provided possible relationships. There are 22 subcategories created; we used them to form generic categories - in creating these groups, we ensured that this would connect back to the research questions (see Fig. 3).

The text data was classified based on the coding category derived from the abstraction results–done for the randomly selected sample of 50% (n = 116) posts and comments. Cronbach's alpha was used to assess the intercoder reliability. We computed for each of the 22 sub-categories, and the Cronbach alpha's coefficient varies from 0.71 to 1.00 -

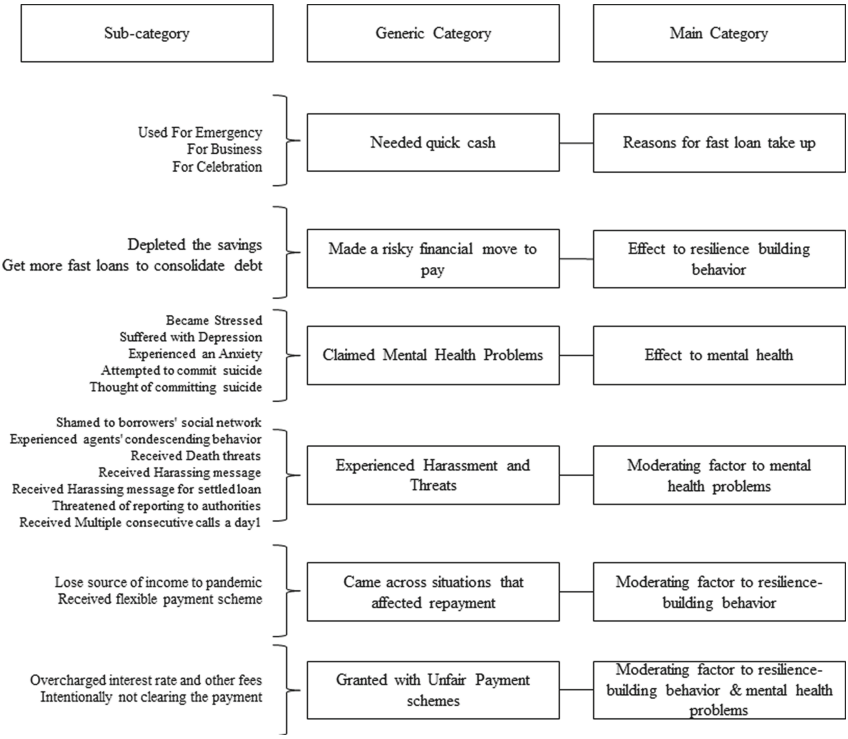

Fig. 3. The diagram showing the abstraction methodology guided by Kyngäs et al. (2020). After creating the sub-categories, generic categories were created; then it was further classified into a bigger set of groups–main categories.

at least an acceptable level of agreement between coders (Lavrakas 2008). We resolved the disagreements through a discussion, and one of the researchers classified the rest of the posts and comments.

As advised by Amigo-Dobaño et al. (2020), we used the Pearson chi-square statistic to verify the association of each created category; we tested every pair of categories. Pearson chi-square uses the difference between the observed frequency and the expected frequency to find an association (Chen et al. 2021). First, we used the subcategories but did not generate any statistically significant results due to lower counts. Then, we used the generic categories and found a significant relationship (presented in Table 4). We did not test the main category since it will give redundant results.

2.4.2 Thematic Analysis

The researchers used the transcribed responses from the semi-structured interviews to conduct an inductive thematic analysis. This method aims to determine the common themes based on each interview conversation. We composed the themes using the Filipino or mixed Filipino and English language transcripts to avoid losing or exaggerating the meaning of the responses, and then, we presented the results in English.

The researchers used the thematic analysis steps suggested by Braun and Clarke (2006) to answer the research questions:

1. Familiarization of the data's notes taken while conducting the interviews
2. Identifying codes per each response: In each answer, we highlighted responses that are relevant to the research questions: (1) motivation for fast loan take-up, (2) effect of the fast loans to their resilience-building behaviors, and (3) mental health.
3. Composing the themes: We grouped all the data into groups based on the codes to identify the main idea of the interviews.
4. Reviewing of themes' relevance to the research problems
5. Defining and naming themes
6. Creation of write-ups

2.5 Ethical Considerations

We provided the interviewees with a brief description of the research before asking for explicit consent for the interview to be conducted. Three days before their scheduled interviews, we reaffirmed their participation, reiterated the study's purpose, and assured them their right to refuse to answer some or all the questions. We stored all the collected information securely, and after the completion of the study, all identifying information was removed from our files.

3 Results

3.1 Statistical Analysis

The following subsections show the results of the Pearson chi-square test and the descriptive statistics of the categories from the content analysis, and the interviewees' characteristics using frequencies, percentages, or mean and standard deviations (if applicable).

3.1.1 Content Analysis of Social Media Texts

In Table 3, we count and summarize the text data using the derived categories from the abstraction method for inductive coding analysis suggested by Kyngäs et al. (2020). It was deconstructed into "main-generic-sub" categories (see Fig. 3).

Consumers borrow fast loans from lending companies because they need immediate cash to attend to their emergencies. While repaying the loan, some posts claim that their lenders gave them unfair repayment schemes, e.g., overcharged interest rates and other hidden fees. The pandemic made the situation much harder since some people lost their jobs. Some consumers depleted their savings to repay. Consumers face some harassment and threats if they do not repay on time, e.g., shamed among their (i) references, (ii) Facebook friends, and (iii) contact lists, approached by agents rudely or received death threats–the worst outcome.

Table 3. Descriptive characteristics of the coded categories of the selected Facebook groups' posts and comments, *N (%)*

Coding categories (Main – Generic – Sub)	Statistics
Effect on mental health	
Claimed mental health problems	
Become stressed	33 (55.9%)
Developed a depression	14 (23.7%)
Experienced anxiety	9 (15.3%)
Attempted to commit suicide	2 (3.4%)
Thought of committing suicide	1 (1.7%)
Effect on resilience building behavior	
Made a risky financial move for repayment	
Depleted their savings to pay	4 (40.0%)
Get more fast loans to consolidate debt	6 (60.0%)
Moderating factors to mental health problems	
Experienced harassment and threats	
Shamed among borrowers' social network	56 (32.4%)
Experienced agents' condescending behavior	29 (16.8%)
Received death threats	9 (5.2%)
Received harassing message while repaying	48 (27.7%)
Received harassing message for settled loan	4 (2.3%)
Threatened of reporting to authorities	20 (11.6%)

(*continued*)

Table 3. (*continued*)

Coding categories (Main – Generic – Sub)	Statistics
Received multiple consecutive calls a day	7 (4.0%)
Moderating factor to resilience-building behavior	
Came across situations that affected repayment	
Lose their source of income due to pandemic	15 (88.2%)
Received flexible payment scheme	2 (11.8%)
Moderating factor to resilience-building behavior and mental health problems	
Granted with unfair payment schemes	
Overcharged interest rate and other fees	71 (98.6%)
Intentionally not clearing the payment	1 (1.4%)
Reasons for fast loan take up	
Needed quick cash	
For emergency	9 (3.8%)
For business	3 (1.3%)
For celebration	1 (0.4%)

3.1.2 Pearson Chi-square Test of Independence

We performed the Pearson chi-square test of independence to all possible pairs of generic categories from the content analysis to know if there is a relationship between the two categories. Table 4 displays the two pairs with a significant association result.

The unfair repayment schemes category is significantly associated with the harassment category, X^2 $(1, N = 231) = 17.06$, $p = .00004$. Consumers who received unfair repayment plans have experienced harassment from the lender. Another chi-square test shows that customers with unfair repayment plans were likely to struggle with mental health issues X^2 $(1, N = 231) = 4.77$, $p = .0290$. Consumers state that they have experienced mental health complications: stress, anxiety, or depression; the reported case of suicide thoughts and attempts may be few, but this is an alarming issue caused by fast loans. The borrowers could have experienced financial stress as they could not pay their loans due to the high interest rates; this caused them to develop poorer mental health.

Table 4. Association of the categories tested using chi-squared statistics, *Pearson Chi-Squared (p-value)*

Categories considered	Statistics
Unfair payment schemes (high interest rate) and Harassment	17.06 (0.0000362*)
Unfair payment schemes (high interest rate) and Mental health problem	4.77 (0.02901*)

* Significant at $p < 0.01$.

The content analysis reveals that borrowers use fast loans for their emergencies. These consumers share on social media that they encounter financial challenges on repayment–some borrowers claim they depleted their savings to repay. Based on the Pearson chi-squared results, lenders' high interest rates and other charges are related to the experience of harassment and mental health issues among consumers.

3.1.3 Characteristics of Interviewees

Table 5 indicates that the 10 participants of the semi-structured interviews are single, young, college graduates working in the private sector. The majority are from the National Capital region of the Philippines and belong to the middle-middle class to the upper-middle class income categories. Their self-reported financial literacy average score is high, 7 out of 10 (70%). During the period of the interview, most have loans, which are not fast loans–home loans, government salary loans, motorcycle loans, and auto loans.

Table 5. Characteristics of the semi-structured Interview participants, mean ± SD or N *(%)*.

Characteristics	Statistics
Age (yrs.)	26 ± 6
Self-rated financial literacy (min. of 1 to max. of 10)	7 ± 2
Gender	
Male	4 (40%)
Female	6 (60%)
Highest educational attainment	
Single	9 (90%)
Married	1 (10%)
Highest educational attainment	
College undergraduate	1 (10%)
College graduate	9 (90%)
Income class	
Low-income class (but not poor)	1 (10%)
Lower middle class	2 (20%)
Middle-middle class	3 (30%)
Upper-middle class	3 (30%)
Rich	1 (10%)
Employment sector	
Private	9 (90%)
Public	1 (10%)

(*continued*)

Table 5. (*continued*)

Characteristics	Statistics
Region	
Cagayan Valley	1 (10%)
CALABARZON	1 (10%)
Central Luzon	1 (10%)
National capital region	7 (70%)
With current loan	
No	4 (40%)
Yes	6 (60%)

3.2 Borrowers' Fast Loan Experiences

This section presents the interviews' thematic analysis synthesized with some findings from the content analysis. It aims to explain the more profound relations of the fast loans to resilience-building behaviors and mental health. We broke down the narrative of borrowers' experiences of fast loan take-up per stage: i) Acquisition stage, ii) Repayment Stage, and iii) Experience Assessment Stage.

3.2.1 Acquisition Stage: Emergency Pushes Filipinos to Borrow Fast Loans Despite Good Financial Control

Across all interviews, each borrower has strict financial management, such as allocating their budget and monitoring their expenses rigorously. During payday, they ensure that a substantial portion (most have more than 50%) of their monthly income will go to necessities, e.g., utility bills, groceries, and savings rather than discretionary consumptions. This behavior makes fast loans unnecessary; unless they need immediate cash to mitigate emergencies, e.g., medical needs by a family member, insufficient money to pay the current bills, and the next salary date is still far away can push them to take up a fast loan. This also corroborates with the content analysis in Table 3: borrowers resorted to loans with quick processing due to the need of urgent cash.

> Participant 6 (23 yrs. old, Middle-middle class, Media Ad Campaign Manager):
>
> *I make sure they are at the top of my list [bills] whenever I receive my salary*
>
> Participant 1 (42 yrs. old, Upper-middle class, Data Scientist):
>
> *(My monthly expenditures) are groceries because of my kids, essentials, house cleaning materials, gas, utilities, tuition. (I spend) too little for extravagance - for snacks like pizza only. My necessities are greater than 95%.*
>
> Participant 10 (24 yrs. old, Upper-middle class, Model Validation Auditor):
>
> *(I pay the) bills, utilities. I also allot (my salary) to savings and a small amount for my wants.*

Participant 5 (23 yrs. old, Lower-middle class, Growth Marketing Officer):

I availed (the fast loan) last year. I am the breadwinner of the family... there was a time when a dog bit my sibling, and at the same time, our refrigerator was damaged. I do not have a large amount of money for vaccines and repair. I took a fast loan because my salary is still far away, and my cash is reserved for bills.

Aside from needing immediate cash, some interviewees get a fast loan due to: (1) their curiosity about the product, (2) fast processing highlighted on the advertisement, or (3) the significant person in their life–urge by a social influence.

Participant 7 (25 yrs. old, Low-income class (but not poor), Municipal Empowerment Officer):

Because of the ads, I became curious. (The) processing is one day - the following day, you have money.

Participant 3 (23 yrs. old, Rich, Customer Insights Analyst):

My girlfriend is working in the finance industry, and that is one of their products; I tried it. Also, I needed it at that time too (for rent payment).

This data shows that emergencies could greatly affect the borrower's fast loan purchase. Customers have satisfactory control of their finances and will only take up fast loans if they need urgent cash to tend to their emergencies; this helps in borrowers' consumption smoothing (Zaki 2016). Some other drivers of the fast loan purchase could be personal and social: they will try purchasing the loan because of their curiosity, social circles, or the advertisement - they the opportunity to apply when they happened to see the ad. Andric and Mooney (2013) highlighted that marketing effectively swayed people to take up fast loans due to its assurance of quick processing.

3.2.2 Repayment Stage: Fast Loans can Cause Negative Mid to Long-Term Impacts– Financial Hardships that Hinder Resilience and Mental Health Problems

While fast loans meet some short-term needs, some borrowers feel that it did not improve their overall financial situation or even worsen it in the mid to long-term. They either saved less or nothing, and it also thwarted the payment of their utility or insurance bills. Borrowers believe that they pay more than the amount they borrowed; repayment amounts can pile up due to fast loans' high interest rates.

Results of the content analysis explained that they pay their dues using their savings or borrow again to consolidate their debts (Table 3). This could trigger financial challenges and lack of savings, leading to possible debt (Melzer 2011; Zaki 2016).

Participant 4 (27 yrs. old, Middle-middle class, Seafarer):

The loan I took up is okay; the processes are fast.

Participant 10 (24 yrs. old, Upper-middle class, Model Validation Auditor): *I used it for my (intended) purpose of emergencies.*

Participant 4 (27 yrs. old, Middle-middle class, Seafarer):

When I focused on paying loans, I had unpaid bills since my income was not regular because of my (job) contract

Participant 5 (23 yrs. old, Lower-middle class, Growth Marketing Officer):

It helped, but I needed to adjust for the next (bills payment) since it (fast loan) has a high interest.

Participant 7 (25 yrs. old, Low-income class (but not poor), Municipal Empowerment Officer):

And at first, I thought it helped because it provided (money) right away, but at the end of the day, it had consequences ... I did not save anything.

Participant 8 (23 yrs. old, Upper-middle class, Ethics, and Compliance Analyst):

It did not help me; it was extremely fast, and the repayment amount would pile up if you did not pay on time. You need to pay right away; the negative effect was that I borrowed too little, but I returned too much.

The processing and repayment schemes impact their mental health; generally, it gives them anxiety and stress. They worry while waiting for the approval of the loan since they need the cash but feel joy when they receive the money.

Participant 9 (23 yrs. old, Middle-middle class, Customer Care Representative):

I am anxious about whether the application can be approved or not...(it's) just the initial application and waiting for the results.

Participant 3 (23 yrs. old, Rich, Customer Insights Analyst):

Upon getting the loan, I felt happy because I could use the money.

Borrowers face anxiety if they cannot repay their dues given insufficient funds and the concurrent need to pay the bills; they overthink where to get the money to pay their dues once collectors send a reminder.

Participant 8 (23 yrs. old, Upper-middle class, Ethics, and Compliance Analyst):

I overthink where to get the money; I am getting crazy. When I received reminders, I felt anxious. I did not borrow too much, but it piled up.

Participant 4 (27 yrs. old, Middle-middle class, Seafarer):

Yes, it affected me in a way. I was anxious because I was thinking about paying the loan or where I could get the money to pay the bills.

Only one borrower has experience harassment–the lender texted his references (parents) about his unpaid loan obligations. He claims that the incident caused him depression and to feel ashamed.

Contrary to the interviews, the content analysis revealed many cases of fast loans' high interest rates and its relationship to harassment and mental problems such as anxiety, depression, or stress–supported by the Pearson chi-square test of independence (Table 4). Our interviewees came from legitimate financial institutions, which made their repayment experience different than the participants who voiced their frustrations and mental health concerns in the content analysis results. They probably applied from illegitimate

institutions or were contacted by third-party collections agencies; outsourcing external agencies to facilitate collections is common in the Philippines.

Participant 7 (25 yrs. old, Low-income class (but not poor), Municipal Empowerment Officer):

They took my parents' contact number, and they texted them…I got depressed, and I am in shame.

The data shows that fast loans help borrowers meet short-term needs, but financial and mental health remain stagnant or become lower while repaying. This conforms to the content analysis results, on which the accumulated interest rates drive the borrowers to deplete or lower their savings. It also disrupts the payment of their bills, and they believe that they owe more money than the amount they borrowed. Borrowers may feel anxiety and stress throughout their experience of repaying their fast loans; a borrower claims to feel depressed due to the shameful text messages his social ties received from the lender.

3.2.3 Experience Assessment Stage: Once the Borrowers Complete their Payment, they use their Borrowing Experience with Fast Loans to Improve their Risk-Coping

In the interviews, the fast loan takers still view borrowing as helpful, especially for emergencies, despite the challenges they encounter while repaying. In Table 5, 6 out of 10 still have loans (not fast loans) after their experience of fast loans. Using their fast loan experience, they become critical of their future borrowing: by checking for loan attributes and borrowing from the government instead of private institutions since it has lower interest rates.

Participant 7 (25 yrs. old, Low-income class (but not poor), Municipal Empowerment Officer):

I am no longer interested in fast loans. I will take government loans instead.

Participant 9 (23 yrs. old, Middle-middle class, Customer Care Representative):

Loans should only be for emergency purposes.

Participant 3 (23 yrs. old, Rich, Customer Insights Analyst):

Yes. Because I already tried it (fast loans), I saw the loans' implications and terms; I understood the loan better. (I can take up loans) since I have a background and experience in fast loans.

The borrowers become risk-averse after taking up the loan - they prefer to build emergency funds and have a resolve to get a loan in case of emergencies. The pandemic amplifies their savings behavior, arguing that it is better to save during these times to avoid future risks.

Participant 6 (23 yrs. old, Middle-middle class, Media Ad Campaign Manager):

It is not a good idea if you do not have savings at all. A fast loan is a bit risky and very tempting - when you make decisions that you have not thought about for a long time, it is extremely dangerous - not something I plan to do again.

Participant 8 (23 yrs. old, Upper-middle class, Ethics, and Compliance Analyst):

(After taking up a fast loan), I thought then that I would save, and I would not borrow until I could. Fast loans offer quick cash, so is the payment too.

Participant 5 (23 yrs. old, Lower-middle class, Growth Marketing Officer):

I prefer saving because it is hard to borrow due to interest (rates), and saving is better because it is your own money

Participant 2 (29 yrs. old, Lower-middle class, Office Clerk):

It is better to save because you do not know what will happen, like this, we are in a pandemic -we should be prepared for disasters

These findings are only evident in the interviews; the content analysis lacks the post-assessment data about fast loans. This data explains the resilience-building behaviors of the borrowers after their fast loan take-up, particularly to borrowing and risk-coping via saving. They still view loans as helpful and will use their experience with fast loans to make better decisions, given their familiarity with its risk. For example, they resolve to get a loan in the presence of an emergency and choose to build their emergency funds–the pandemic amplifies this behavior due to unseen risks.

4 Discussion and Conclusions

Our study has shown that Filipino borrowers rely on fast loans for emergencies; however, they also encounter repayment challenges because they need to pay the principal amount with high interest rates. Liu (2021) reported that financial institutions imposed high interest rates and other charges on loan products for about 32.8% per annum–these could have lowered their savings and contributed to their stress and anxiety. Using a Pearson chi-square test in the social media content analysis, we found that a fast loan's repayment with a high interest rate is related to borrowers' experience of harassment and mental health issues. Once the borrowers completed their payment, their risk-coping mechanism appears to be strengthened. For example, these consumers could make informed loan decisions and focus on building up their emergency funds in the future. Despite the stress associated with getting fast loans, borrowers learned more about the attributes of the loan and developed coping strategies against future crises using their experience with fast loans.

Fast loans appeal to consumers through the quick application process and cash disbursement (Andric and Mooney 2013). Suri et al. (2021) showed that for borrowers who completed their payment in the short term, their quickly distributed digital loans had supported their resilience as they were able to address their household expenses in the middle of financial shocks. On the other hand, if the borrower is unable to repay the amount owed in a timely manner, the loans charges and higher rates may result in lowering the customers' savings and bills payment, potentially leading to an incurred

debt. Some studies showed that taking up this type of loan made financial management more challenging, leading to financial distress or debt (Melzer 2011; Brown and Woodruffe-Burton 2015; Szilagyiova 2015; Zaki 2016), which later resulted in mental health problems (Richardson et al. 2013; Sweet et al. 2018; Dackehag et al. 2019; Jaeyoon 2019). As a fast loan can secure financial resilience, it can inadvertently prompt financial and mental well-being difficulties due to high interest rates and other fees imposed by the institution granting the loan.

The Pearson chi-squared results of the content analysis highlighted that those who receive high-interest repayments from fast loans had experienced collection harassment and mental health problems. Content analysis results show that lending companies shamed the borrowers among their peers, or collection agents reached them out with condescending behavior. Furthermore, they claim to be stressed, anxious, depressed, or worse, thought of suicide. Other researchers also linked lenders' high-interest repayment schemes to mental issues (Drentea and Reynolds 2012; Zurlo et al. 2014). Financial institutions and lending companies in the Philippines commonly outsource the collections process to third party collection agencies whose conduct and behavior may not be fully managed. In our interviews, most of the borrowers applied to legal financing institutions and had a different experience, compared to the participants who voiced their dissatisfaction in the content analysis findings.

Even though they have cleared their fast loans before the interviews, six out of the ten interview participants still had a loan: home loans, government salary loans, motorcycle loans, or auto loans. This shows that they still perceived loans as beneficial. Furthermore, the COVID-19 pandemic has strengthened their resilience-building behaviors: they recognized the need to save more and carefully evaluate their next loan decisions to avoid future risks such as emergencies. But we note that these individuals' average self-rated financial literacy rate is high ($M = 7$, $SD = 2$) (Table 5) – this could have caused their better financial decisions. Lusardi (2019) said that financial literacy has a long-term influence on long-term financial decisions. The experience of going through the pandemic, and understanding loan risks, have impacted the description-experience gap of these borrowers - they became risk-averse and will be able to make better future choices regarding their financial management (Camilleri and Newell 2013).

4.1 Limitations of the Study

Our study has limitations and must be interpreted with caution. We acquired a small sample using convenience sampling for the interviews - this may not represent all Filipinos who took up fast loans. We could not establish the economic differences of the regions since our participants are from Luzon, to which many came from the National Capital Region. The self-rated financial literary of the interviewees lacks variation because they gave themselves high scores. They could have better control over their finances after learning the risk of fast loans. At the very least, the interviewees came from various income levels, which could have saturated our findings. We gathered purposive social media posts since relevant posts are difficult to mine using API (Application Programming Interfaces) methods. In Twitter, we observed that most fast loan tweets are about advertisements, and Facebook's API follows stricter security access for community groups. Instead, we manually sampled the texts, but most samples are about fast

loans from Philippine Fintech companies. Still, we obtained their actual situation and story because they shared and consulted it among the group members. We used a different data source and analysis for the interviews and social media texts. However, we developed and synthesized the insights for both approaches of the mixed methods design through the guide of other researchers' rigorous scientific steps.

We suggest that a broader, more comprehensive analysis may be needed to better understand Filipinos' financial situations and experiences. This study also raised the idea of showing the quantitative impact of fast loans on resilience-building behaviors and mental health. Future researchers can use surveys to quantitively map interrelationships within the factors.

4.2 Recommendations

The study's findings do not detract from the importance of fast loans among the borrowers - immediate cash is helpful in times of emergencies. This paper highlighted ways in which fast loans can derail borrowers' financial and mental health. Thus, Philippine credit regulators can consider aggregating all loan details from legal and financial institutions into an accessible, easy-to-use loan portal. This aligns with Sunstein and Thaler's (2008) idea of informed loan choices - giving borrowers the verdict to choose the loan most suited for them by simultaneously comparing the products between and within financial institutions.

The findings also highlighted that some lenders had offered high interest repayment plans or collected payments using harassment and threats, e.g., shaming. We hope that the study can encourage Philippine institutions, such as the Securities and Exchange Commission (SEC), to monitor lending companies and collection agencies to reduce physical and mental harassment towards borrowers. Additionally, departments within the government agencies, like the central bank, Bangko Sentral ng Pilipinas (BSP), and financial institutions, can reinforce Filipino's finance education with additional knowledge about the importance of savings and better loan choices, especially during this pandemic. Consumers will have a chance of avoiding financial hardships in future crises.

We hope to develop a behavioral data model in our future project using these findings. Financial institutions may find such data models beneficial when evaluating loan quantum and tenor–for example, empathetically considering the consumer's financial resiliency when granting fast loans.

4.3 Summary

We found that borrowers have relieved their emergencies by borrowing through fast loans. However, they encountered difficulty in repayment due to the loan's high interest rates, which decreased their savings and added anxiety or stress. The content analysis revealed that lenders' high interest rates and hurtful collection harassment contributed to further stress. The interviewees shared that they are now more equipped against future risks like the COVID-19 pandemic–they are keen on saving and will choose better loans in the presence of emergencies. These results provided qualitative inputs for our future behavioral models that will reflect consumers' financial resilience before giving them

the loan. We also suggest regulating the collection agencies, which will reduce further mental strain on borrowers.

Disclaimer: The views expressed here are solely those of the authors and do not, in any way, represent the views of the Union Bank of the Philippines, the University of the Philippines, or the Aboitiz Data Innovation. The participants involved in this study were not recruited through these institutions.

Appendix a – Semi-Structured Interview Question Design

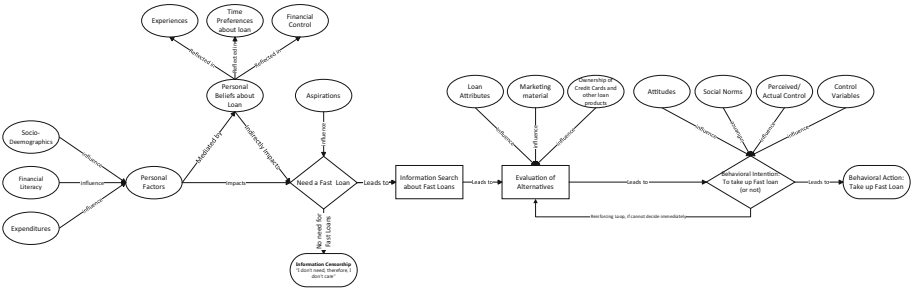

Fig. 4. The diagram shows the variables integrated with the semi-structured interview questions. Spherical diagrams represent conceptual variables; Arrows going to the right shows the direction of the process; Outward arrow's direction means they are part of the latent variable they are associated with; Ongoing arrow from concept shows that it directly impacts the specific step of the decision-making process.

Table 6. Questions and Probes asked during the interviews

Factors and sub-factors	Question	Probe question 1	Probe question 2
Personal factors			
Socio-demographic			
Name	Please state your name, or how would you like to be called?		
Age	Please state your age, or what is the age bracket you are currently in? e.g., 40 to 44, 45 to 49		

(*continued*)

Table 6. (*continued*)

Factors and sub-factors	Question	Probe question 1	Probe question 2
Location	Can you tell me where the location or area is do you stay most frequently?		
Educational Attainment	What is your highest level of education attained so far?		
Nature of work/Business	Are you currently earning income from employment?	If so, what is your occupation?	Do you work part time, full time? Can you share what sector or industry?
Marital status	Can you tell me what your current marital status?		
Household income	How would you classify your current family income bracket? (To show Table 1)		
Expenditure	What is the breakdown of goods that you usually spend your money on? (monthly)	What situations do you feel that your income is not enough for your usual expenditure?	In your subjective perception, of your expenditures, how much (%) are for necessity and how much is for the luxury/extravagance?
Financial Literacy	Currently, from 1–10, how do you rate the level of your financial literacy?	What made you think that way? Kindly elaborate	
Personal beliefs about loans			
Financial control	On a scale of 1 to 10, with 10 as extremely agree, do you pay your bills a) regularly, and b) on time?	Why is it so?	
Experience	Have you taken up a loan in the past?	If yes, describe a situation when you have taken up a loan in the past	How and what did you use the loan for?

(*continued*)

Table 6. (*continued*)

Factors and sub-factors	Question	Probe question 1	Probe question 2
Financial well-being	How would you describe your financial situation after taking up the fast loan? Did it help your financial situation or not?	How were your savings? Your Bills payment?	Do you have insurance? If yes, was your payment affected? If not, why aren't you purchasing insurance?
Mental well-being	Did the quick loans affect your mental health before?	Can you tell us about the events or experiences that made you come up with that answer?	What you felt after repayment
Time Preferences	What is your view about getting a loan now vs. saving in the future? Which one do you prefer and why		
Problem recognition			
Need for fast loan	What are the possible reasons that you may need to take a quick loan in the near future, say the next 12 months?		
Aspirations	What are the projects that you want to do that you cannot now?		
Behavioral intention & Evaluation of alternatives			
Attitude	Do you think that taking up a fast loan is a good idea or not? Why or why not?	How do you think this view about loan can impact you in taking a quick loan today?	
Intention	If a financial institution texted you today or in the next two weeks that you are eligible for a quick loan, would you take it? (To show the marketing material)	Why or why not?	

(*continued*)

Table 6. (*continued*)

Factors and sub-factors	Question	Probe question 1	Probe question 2
Marketing	What are your thoughts about these marketing messages?	Is it relevant to your life right now? If yes or no, how?	
Actual control	If you are to take out a quick loan now, do you know if you will be able to make the repayments a) on schedule, b) or ahead of schedule?	Why or why not?	
Perceived attributes	What are the ideal attributes you are looking for when evaluating a loan?		
Control variables	Will the current pandemic affect your decision to a) take up, or b) not take up a quick loan?	Why or why not?	Do you think your decision will change if we are not in a covid-19 situation today?
Injunctive norms	Do you know anyone, significant in your life, who took up a quick loan?	How do you think this might impact you in taking a quick loan today?	
Descriptive norms	Is there anyone significant in your life that may influence you to take up or not take up the loan?	Who is that individual?	How did he/she affect you?

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Motivation and Cognitive-Behavioral Factors in Problematic Online Gaming

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Abstract. A portion of the US population is choosing online games as a form of recreation and, consequently, is developing unhealthy preoccupations. The most notable form of Internet addiction for the past 20 years has been Massive Multi-user Online Role-Playing Game (MMORPG) with adults between 20 and 40 years old identified as high risk of developing problematic online gaming behaviors. Problematic online gaming behaviors and the resultant functional impairment of daily living that adults experience from playing MMORPGs was the problem addressed in this study, while the purpose was to provide further insight into those behaviors that adults experience from playing MMORPGs. This study used descriptive, pre-transcendental, psychological phenomenological methods and associated five-step phenomenological psychological data analysis and was predicated on the integration of the Online Gameplay Motivations Theory and the Cognitive-Behavioral Model of Pathological Internet Use. Seven adult participants who have played numerous MMORPGs over a period of no less than 5 years and as recently as 2 months were recruited. Interviews provided raw data, the analysis produced 26 themes and subthemes, which answered four research questions. The results indicated that adult MMORPG players who experience problematic online gaming behaviors experience both benefits (e.g., access to virtual-relationships, increased attention and focus, increased technology competency) and detriments (e.g., maladaptive cognitions, behavioral symptoms) from this online gameplay.

Keywords: Motivation · Problematic online gaming · MMO · MMORPG · Phenomenology · Gamers · Online gameplay

1 Introduction

Computer technology and access to the Internet are now commonplace in both worksites and homes. Both technologies are integral for the economic, political, and social functioning of modern societies (Curran et al. 2016). Computer technology has been commercially accessible to the US general public since 1983, while access to the Internet is more recent as of 1990 (Curran et al. 2016; Wodjao 2007). Over the past 40 years, there has been an exponential increase of computers in US households growing from 8% in the 1980s, to 37% in the 1990s, to 69% in the 2000s, and to 83% in the 2010s (International Telecommunication Union [ITU] 2018; Wodjao 2007). Internet access in

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households has seen a similar increase, over the past 25 years, with 18% in 1997, to 62% in just 6 years, and to 81% in 2018 (Day et al. 2005; ITU 2018). Internet cafés have become an alternative for those without access to the Internet at home (Wong and Lam 2016). Both access to computers and the Internet at home has led to higher daily use of each of these technologies resulting in people spending long periods of time in front of a computer screen.

The growth of the Internet is unprecedented with now more than 30% of the world's population with access, which translates to over 2 billion Internet users (Curran et al. 2016). Youth and emerging adults between 15 and 24 years old access the Internet at higher proportions at 94.3% in developed countries and 67.3% in developing countries (ITU 2017). Survey results released from the Pew Research Center reveals American adults and youth are choosing computer games as a form of recreation at rates between 48% and 77% (Duggan 2015). Furthermore, adult males (e.g., 50%) and females (e.g., 48%) are choosing online gaming at similar rates (Duggan 2015). A portion of the population, as a consequence, develops unhealthy preoccupations with activities on the Internet.

The most notable form of Internet addiction for the past 20 years has been Massive Multi-user Online Role-Playing Games (MMORPG) with adults between 20 and 40 years old identified as high risk of developing problematic online gaming behaviors (Ferguson et al. 2011; King et al. 2019; Kuss 2017). MMORPG genre differ from linear gameplay (Braithwaite 2018; Roy and Ferguson 2016) in the following ways: (a) persistent-state open virtual-worlds, (b) no conclusion to the game, (c) routine daily progress tasks, (d) routine updated game content and game balance, (e) player-built virtual-communities, and (f) sustained collaboration. Recent scientific reports implicate online games, as one of these aspects of the Internet in which technology is used excessively and unhealthily; therein, players of online games are developing problematic online gaming behaviors (see Griffiths et al. 2016a; Kardefelt-Winther 2014a; Saunders et al. 2017). Studies indicate, contrary to stereotypes, adults rather than youth are more likely to engage in online gameplay (Bergstrom et al. 2016; Molesworth and Watkins 2016). Contrariwise, the available research literature focuses on youth (Anderson et al. 2017; Stavropoulos et al. 2017). Given a meta-analysis of 33 published studies, adults between 20 and 40 years old in the US are identified as a high-risk group at rates of 3.1% (Ferguson et al. 2011). Nationally representative samples, from both Eastern and Western countries, indicate prevalence rates ranges between 2.4% to 45% (Pontes et al. 2016; Rehbein et al. 2015, 2016; Rücker et al. 2015; Wittek et al. 2016). These prevalence rates foreshadow problematic online gaming behaviors as a global crisis.

1.1 Statement of the Problem

The problem addressed by this study is the problematic online gaming behaviors that adults experience from playing MMORPGs (King et al. 2016; Lopez-Fernandez 2018; O'Connor et al. 2016). Problematic online gaming behaviors frequently includes sleeping, eating, bathing, and toileting deprivation (Lopez-Fernandez 2018). Decreased employment performance, employment loss, and long-term unemployment are often experienced (Király et al. 2017; Lee et al. 2017). This preoccupation extends beyond gameplay with adults abandoning social and recreational activities to spend additional

time on MMORPG-related online gaming forums and private social networking groups (King et al. 2016; Kuss 2017; Lopez-Fernandez 2018). Deceiving partners, spouses, family, and friends to continue engaging directly or indirectly with MMORPGs is commonly experienced (Lopez-Fernandez 2018).

Overall, the consequence of problematic online gaming behaviors is functional impairment of daily living (Kuss 2017). Adults have jeopardized their education, employment, relationships, psychological wellbeing, and physical health from consequential impairments (Király et al. 2017; Lee et al. 2017). Examples of resulting impairments include (a) poor academic and vocational performance; (b) real-world familial and social relationship withdrawal; (c) behavioral dysregulation and social dysfunction; (d) depression and anxiety symptoms; (e) feelings of loneliness, irritability, or sadness; (f) poor sleep, dietary, hygiene, and toileting routines; and, (g) overall, poor physical health and obesity (Baturay and Toker 2019; Faulkner et al. 2015; Kaptsis et al. 2016; King et al. 2016; Lopez-Fernandez 2018; Martončik and Lokša 2016). In the most extreme cases, crimes and death have occurred (Denham and Spokes 2019; Rowlands et al. 2016; Spragg 2017). If this problem is not addressed, problematic online gaming behaviors will continue to impair daily living for adult MMORPG players (King et al. 2016; Lopez-Fernandez 2018; O'Connor et al. 2016).

Adult MMORPG players' perceptions of the progression and prevention of problematic online gaming behaviors are unknown (Billieux et al. 2015; Lopez-Fernandez 2018). Various methods to obtain quantitative and qualitative data exist; however, the majority of studies have used quantitative methodologies and, as such, there is a paucity of qualitative studies (with a few recent exceptions; King et al. 2016; Lopez-Fernandez 2018; O'Connor et al. 2016). Of the limited qualitative studies on this topic none to date attempted to describe and explicate the complexity of the phenomenon of problematic online gaming behaviors through psychological phenomenological methods or collectively investigated motivation to play MMORPGs, maladaptive cognitions, preexisting psychopathology, life stressors, situational cues, and exposure to technology involved with problematic online gaming behaviors. Therefore, this study aimed to fill the gaps in the qualitative literature base on this topic.

1.2 Principal Aim and Theoretical Framework

The principal aim of this study was to understand the lived experiences of adult MMORPG players that exhibit problematic online gaming behaviors. Investigation of these behaviors directly from this population has the potential to enhance the understanding of problematic online gaming behaviors, high engagement, Internet gaming disorder, and gaming disorder. The following research questions were used to guide the gathering of data for this study: (a) What are adult MMORPG players' lived experiences of non-problematic online gaming? (b) What are adult MMORPG players' lived experiences of problematic online gaming behaviors? (c) What are adult MMORPG players' lived experiences of attempts to prevent problematic online gaming behaviors? (d) What are adult MMORPG players' perspectives of how problematic online gaming behaviors might be prevented?

The theoretical framework of this study was predicated on the integration of the Online Gameplay Motivations Theory (Yee 2006) and the Cognitive-Behavioral Model

of Pathological Internet Use (Davis 2001). These two models were the most effective theoretical inquiries for this research and was triangulated and qualitatively applied to the research findings. The emergence of themes was made possible through the framing of two theories that focus on separate aspects of problematic online gaming behaviors. With just the theoretical lens of Davis' (2001) model, there would have been a focus on problematic online gaming behaviors purely from a psychopathological standpoint. Yee's (2006) model provided a counterbalance to a purely psychopathological approach allowing for the emergence of themes of motivational factors behind behaviors. Therefore, theory triangulation best aided in the task of describing and explicating the complexity of the phenomenon of problematic online gaming behaviors (Turner and Turner 2009). Additionally, theory triangulation addressed the current debate of potential erroneous pathologizing of normal behaviors and normal aspects of contemporary culture and society (Aarseth et al. 2017; Deleuze et al. 2017, 2018; Dullur and Starcevic 2018; Griffiths et al. 2016b; Kuss et al. 2017a, 2017b, 2017c; Lee et al. 2016, 2017; Petry et al. 2016; Przybylski 2016; Sanders and Williams 2016; Saunders et al. 2017).

2 Materials and Methods

Permission to conduct this study was obtained from Northcentral University's Institutional Review Board in 2020. Field-testers were e-mailed an expert package for review which included the consent letter and field-test form.

2.1 Design

Descriptive, pre-transcendental, psychological phenomenological methods were used (Giorgi et al. 2017). The qualitative, descriptive, pre-transcendental, psychological phenomenological methods addressed the problem because there is a paucity of qualitative evidence about the lived experiences of adult MMORPG players who experience problematic online gaming behaviors in the research literature. This is especially true in regards to the motivation, maladaptive cognitions, life stressors, exposure to technology, and situations cues that contribute to problematic online gaming behaviors of adult MMORPG players.

Giorgi and colleagues (2017) developed strictly descriptive phenomenological methods for psychological research rooted in non-interpretive Husserlian philosophical phenomenology. Giorgi posits that lived experiences can be described by a thorough phenomenological psychological analysis of data within the perspective of the phenomenological psychological reduction (Giorgi et al. 2017). While philosophical transcendental reduction is interested a completely purified lived experience of consciousness, phenomenological psychological reduction is interested in actual human consciousness (Giorgi et al. 2017). This particular methodology allowed for a descriptive account of adult MMORPG players' lived experiences unadulterated, complete, and absolute without interpretation as it allowed for the distillation of lived experience into the psychological structure of the experience (Giorgi et al. 2017). Moreover, the qualitative, descriptive, pre-transcendental, psychological phenomenological methods allowed for adult MMORPG players' lived experiences to be reduced to psychological meaning

rather than philosophical meaning units. This allowed for the representation of the psychological significance of the meaning of the idea and the preservation of the psychological integrity of the idea being expressed without distorting or missing the psychological significance of the lived experience.

2.2 Participants and Procedures

The target population for this research study was adult MMORPG players between the ages of 18 and 40 years old living in the US given that 3.1% of adults in this age range were identified as a high-risk group for developing problematic online gaming behaviors (Ferguson et al. 2011). Participants were required to be native English speakers, writers, and located in the United States. In terms of nationality, adult MMORPG players were limited to those living in the United States to ensure similar cultural and historical context of their lived experiences. The *a priori* inclusion criteria required participants to report (a) having played MMORPGs over a period of no less than 5 years, (b) having experienced or currently experiencing problematic online gaming behaviors, and (c) investing a minimum of 20 h a week in MMORPG gameplay and/or non-gameplay associated MMORPG activities. The length of time playing MMORPGs in general was determined to ensure participants could provide depth of experience instead of short-term encounters with MMORPGs. MMORPG players often commit to years of long-term gameplay in a particular MMORPG game title as they build lasting, durable, and meaningful social relationships by means of virtual-communities (Braithwaite 2018; Cărătărescu-Petrică 2015).

Recruitment entailed posting messages to MMORPG-related online gaming forums and social media platforms. Only open to the public or open, moderated forums was used for recruitment. Snowball sampling and *a priori*, criteria-based sampling strategies were additionally used. Qualitative semi-structured interviews guided by an interview guide were conducted through Skype, a means of electronic communication capable of video conferencing, audio-only conferencing, and instant messaging. Skype has growing support as an equivalent or superior mode of conducting qualitative interviews compared to in-person interviews (Johnson et al. 2019; Sipes et al. 2019).

Research has demonstrated Skype to have clear advantages to other modes such as gathering word-dense transcripts, producing conversation turns, and field notes from research participants (Johnson et al. 2019; Sipes et al. 2019). Moreover, there are situations where remote interviews are necessary or advantageous in reaching populations that are geographically dispersed or cost prohibitive to access (Johnson et al. 2019; Sipes et al. 2019). MMORPGs aim to provide unrestricted geographical and temporal cooperative and competitive gameplay; thus, Skype had clear advantages in conducting remote interviews for this population compared to face-to-face interviews. It was more likely that this sample population of gamers will understand applications similar to the function of Skype and, thus, should be tech savvy sufficiently to use Skype as a mode of interview.

With COVID-19 pandemic, massive unemployment, extreme climate change-related weather events, recent social justice protests occurring simultaneously, both globally and nationally, an increase in access to mental health services was expected for emotionally and psychologically distressed people coping with suicidal ideation. Referrals were

made available to free, confidential, 24-h-a-day, 7-days-a-week, 365-day-a-year mental health services national providers for study participants who exhibited or self-reported current emotional or psychological distress. Referrals to the National Suicide Prevention Lifeline and Substance Abuse and Mental Health Services Administration (SAMHSA) National Helpline, both services were available in English, Spanish, and other languages and appropriate referrals were offered. No participant requested or was appropriate for referral.

2.3 Instrument and Analytical Strategy

The two main instruments for this study were an interview guide and the researcher-as-instrument. The same interview protocol was used for each participant to provide basic and uniform structure. Process and procedural consistency, comparability, reliability, and enhanced analysis was established through the use of an interview guide. The interview guide consisted of 13 open-ended, expansive questions which allowed each participant flexibility and latitude in their response in an effort to collect realistic, accurate descriptive accounts of adults' lived experiences of problematic online gaming behaviors from playing MMORPGs.

Questions in the interview guide were designed with Internet gaming disorder criteria in mind (APA 2013, Section III, p. 2). The interview guide contained space for notetaking and reflection. The interview guide was created and field-tested by three experts in technology-based addiction to (a) determine alignment between the research questions and interview questions, (b) examine the effectiveness and understandability of each interview question, while avoiding ambiguity, (c) addressed question ordering to avoid question- and response-order biases, and (d) determine length of the interview to avoid technology burnout or fatigue, while allowing for time for the participant to produce rich descriptions of the lived experience of problematic online gaming behaviors (Brinkmann and Kvale 2015). Field experts with a minimum of three years of either research or counseling experience treating technology-based addiction were selected using purposive and convenience sampling.

As the researcher was an instrument of the study and therefore was subjected to bias, questions were open-ended and semi-structured in an effort to capture the desire research information. Open-ended, semi-structured questions allowed for flexibility and latitude enough for each participant to freely move in different directions and express lived experiences containing feelings and perceptions through self-reflection, stories, and anecdotes (Brinkmann and Kvale 2015). The researcher has over 18 years of counseling experience exceeding 19,000 h of direct client hours; moreover, the researcher has played MMORPGs since 1996 as an EverQuest beta-tester and, overall, played MMORPGs for nearly two decades off-and-on. Research bias is a well-known phenomenon, and the researcher made every effort to minimize his own bias by allowing participants to freely express their own opinions and lived experiences without interpretation or judgement. The researcher committed to phenomenological bracketing with a disclosure of knowledge, experiences, and gameplay history related to the research topic.

Data gathered from transcription of the interview was collected and analyzed manually and electronically with NVivo 12. Manual data analysis was the primary method, while electronic data analysis was the secondary method. Trustworthiness of expressed

lived experiences, feelings, perspectives, and opinions were strengthened by comparing manual and computer-assisted results (Niedbalski and Ślęzak 2017). Giorgi and colleagues' (2017) five-step phenomenological psychological data analysis was employed for manual data analysis. NVivo 12 software was used secondarily during analysis and aided in the storage and organization of data in an effort to assist the researcher. Furthermore, NVivo 12 software was used to identify any themes that might be overlooked by the researcher. Lastly, hand tabulation was used to summarize participant demographics and frequency of thematic agreement.

3 Results

The purposeful sample consisted of seven adult MMORPG players in the US who had experience with MMORPG-related problematic online gaming behaviors. Participants were interviewed for this qualitative, descriptive, pre-transcendental, psychological phenomenological study (Giorgi et al. 2017). The data were analyzed using the five-step phenomenological psychological data analysis (Giorgi et al. 2017). Forty-seven pages of interview transcripts were collected in total. Interviews were the only source of data collection and were accomplished through open-ended semi-structured Skype interviews.

3.1 Participant Demographics

The participants' demographics with assigned pseudonyms are outlined in Table 1.

Table 1. Demographics of participants

Pseudonym	Age	Sex	Marital status	Years of MMORPG gameplay
Thomas	40	Male	Single	17
William	24	Male	Married	8
Henry	26	Male	Single	19
Archie	29	Male	Single	23
Noah	37	Male	Married	20
Jacob	30	Male	Married	16
Charlie	40	Male	Married	22

Participants consisted of all male MMORPG players between the ages of 24 and 40 years old. The average age of participants was 32.28 years old. Four participants endorsed being married (57.1%), while three endorsed being single (42.9%). Years of gameplay related to MMORPG was reported ranging from 8 to 23 years with an average of 17.85 years. Combined years of MMORPG-related gameplay totaled 125 years of experience reported by seven participants. All participants were located in the US at the time of the interview. Ethnicity, employment, and education obtainment were not intentionally nor consistently collected from or reported by participants.

3.2 Themes Related to Lived Experience of Non-problematic Online Gaming

Three themes emerged from the data analysis of the research question: What are adult MMORPG players' lived experiences of non-problematic online gaming? Pseudonym of participant and their produced quotes are presented in narrative format. The themes and frequency of thematic agreement (e.g., 50 references total) are presented for each corresponding theme in Table 2.

Table 2. Themes related to lived experience of non-problematic online gaming

Theme	Frequency of agreement
Improved access to and maintenance of relationships	$\sum = 38$
Increased attention and focus	$\sum = 6$
Increased technology competency	$\sum = 6$

3.2.1 Improved Access to and Maintenance of Relationships

Participants described their lived experiences of MMORPG gameplay that were non-problematic. All seven participants identified positive consequences and benefits of their online gaming. Improved access to and maintenance of relationships emerged as a theme. Thirty-eight thematic references for this theme were provided in total.

Thomas shared 10 references in total related to improved access to and maintenance of relationships. The raw data is as follows:

1. If I told friends in-game I would meet them for something I saw it the same as in real-life and vice versa.
2. socializing and meeting new people, interacting with others and learning new things and keeping busy without only focusing on work.
3. It also gives something to do at night where many in the community I live in partake in drugs and alcohol to excess.
4. I believe I'm more helpful to strangers in game than I would be IRL.
5. If I'm playing with a friend that enjoy our time together can play for a long time while talking about random things and maximizing time with what others might only be playing. Creates memories that will stick with me for many years.
6. I don't have a lot of demands on my time living alone and hasn't impacted any relationships I have been in.
7. I don't have people that just pop in for a visit where I live, so less chances on getting distracted and the few that might want to come by are also gamers so they understand and are more interested in what I'm playing.
8. I do have people that play games that can talk to it about, but in other groups with find something else.
9. Relationships I have been in while gaming I have brought my girlfriend in to play.
10. Also, other girlfriends have appreciated knowing that I was at home and not doing things that would make them jealous.

When Thomas used the term IRL he is using an abbreviation for "in real-life."
William shared 3 references in total:

1. It's very easy to make new friends.
2. When I had a job that literally had me in the middle of California forests with no way to communicate with the outside world for weeks at a time.
3. Video games were my only friends when I was a kid, and as I grew up people online were mostly my only friends.

Henry provided 10 references in total:

1. Probably one of the biggest pluses is that all of my siblings are into games as well.
2. I no longer speak to my eldest brother anymore, but when I did, we would often play MMORPGs together.
3. More recently, my not-oldest brother—middle brother? I have two, both are older than me—and I were playing a lot of Ultima Online together which is the first MMORPG that my oldest brother got us both into, and that was really fun. Some good nostalgia, but the game itself still holds up so playing it was fun for us both.
4. Even further than siblings, even my mother enjoys playing them super casually. She has played a lot of World of Warcraft, Guild Wars 2, and Star Wars: The Old Republic, so she and my siblings and I would sometimes play those together. So, to sum that whole thing up, MMORPGs have helped my family bond.
5. When I started out, I was just following my oldest brother around, pretty much. I'd play whatever game he was playing.
6. There has always been a level of real-life socializing in my gaming habits, with friends and family who enjoy them as well.
7. I'm very shy in real-life. I've had therapists who have said I have social anxiety, going up to other people and talking to them has always been difficult for me. I think video games have always been my default, so to speak. In other words, because I think I explained that poorly, since I know I always have video games available as a means to have fun or pass time.
8. I actually really enjoy socializing and hanging out with other people, but actually being the person to go up to others and create those opportunities for myself has always felt like a huge wall for me, and video games are something I could always do by myself. If given the opportunity to hang out with other people instead of stay home and play games I will do that.
9. Growing up, and still honestly to this day, there always seems like there's a stigma with social anxiety. I don't think anyone wants to be the weird kid who isn't talking to their peers, and just sits in the corner unnoticed, but it can be really hard for someone to go from that "weird kid," to someone who actually does create opportunities for themselves if you already have the "weird kid" reputation.
10. As I've mentioned I think multiple times now, I personally really enjoy doing non-video game things as well, but most of the things I enjoy require other people, and the other people are always the hurdle I need to get over, as in getting a group of people to hang out with, not the people themselves.

Five references were produced by Archie:

1. I believe it's a good and cheap source of entertainment when done in moderation, and a great way to meet people.
2. I've made and met friends from other countries and my own in real-life through online gaming.
3. I feel gaming especially amongst younger people is far more accepted than it was when I was 12 for example. Pretty much everyone I know knows that most of my time is spent on gaming.
4. I regularly wonder if I'd even have fun anymore if it wasn't for the friends I have made.
5. I think it still affects my ability to study though. I have a very short attention span and get distracted easily. Something that really only seems to stop when I'm hooked on a game.

Noah also provided five references in total:

1. Continuing to play MMORPGs hasn't caused any problems between myself and other people that I'm aware of.
2. My wife plays MMORPGs with me and she once worked for the parent company of an MMORPG. We would go to national conventions and events, so there is no need to hide it from her or anyone for that fact.
3. For me MMORPGs represent a broad set of goals and challenges that are enjoyable to pursue, especially with friends.
4. I enjoy meeting people in-game and prefer those interactions compared to real-life relationships.
5. My MMORPG playing has never jeopardized a relationship, job, educational, or career opportunity that I'm aware of. I work in the tech field and it is common for co-workers to play games too. I have had interviews where the topic comes up. I think I might have gotten certain jobs because my co-workers can relate to gaming.

Jacob produced a total of two references for this theme:

1. Online gaming is an opportunity to maintain connections with friends, especially those who have moved away.
2. It also improves my teamwork

Lastly, Charlie provided three references:

1. With 24/7, global MMORPGs, there was always someone on. I would have friends on the east coast, west coast, and Australia that I'd play with and gain exp and build on our friendships. In real-life people sleep, have other obligations, or feel like I come on too strong and intense during the beginning of the relationship.
2. If I get into a guild, I often play more to help guildies get better.
3. It just sucks that others think I am coming off too intense or think I am a nerd for knowing about things that all-in-all interest me. The consequences of friendships is what I avoid in real-life, but get to experience in-game.

When Charlie uses the term guildies he is using slang for members of the guild a player has membership with. A guild is an in-game collection of players either small or large from many different geographic areas that band together to socialize and complete in various in-game content.

3.2.2 Improved Access to and Maintenance of Relationships

Participants described their lived experiences of MMORPG gameplay that were non-problematic. Two participants identified positive consequences and benefits of their online gaming. Increased attention and focus emerged as a theme for research question 1. Six thematic references for this theme were provided in total.

Thomas produced three references:

1. I have used games or working out to focus on something else for a short period or to calm down and be able to decide if it was something that really mattered or more time to think about it.
2. If I'm grinding by myself, I can think about the thing and different ways to deal with the issue or if something that can let it go as it isn't worth it.
3. I still have increased my knowledge by reading articles or manuals on work stuff while gaming or listening to videos at the same time.

Jacob also produced three references:

1. It also improves my teamwork, computer skills, and ability to think quickly under pressure.
2. Online games give easy access to a flow state compared to other activities, which I think is beneficial.
3. It's like my body will do whatever it can to just start the process, and once it's started, I can be there for hours.

3.2.3 Increased Technology Competency

Participants described their lived experiences of MMORPG gameplay that were non-problematic. Four participants identified positive consequences and benefits of their online gaming. Increased technology competency emerged as a theme for research question 1. Six thematic references for this theme were provided in total.

Thomas produced the statement, "Some hobbies that I have are all computerized and have expanded my knowledge on automating them and only have to fix issues from time to time." Jacob made the statement, "It also improves my teamwork, computer skills, and ability to think quickly under pressure." Noah stated, "I work in the tech field and it is common for co-workers to play games to. I have had interviews where the topic comes up. I think I might have gotten certain jobs because my co-workers can relate to gaming."

Henry produced three statements:

1. Something else I enjoy about MMORPGs is that I personally really enjoy teaching in general, and while it's not a career path I was to pursue (seems way too stressful),

MMORPGs can be really good as a way for me to get that teaching itch scratched. Since it's my favorite genre, I tend to play them a lot as well as do a fair amount of research and practice, so I usually have a good grasp on most things about them.
2. MMORPGs are kind of complicated by design, since they usually involve an entire fantasy world, so I enjoy helping people learn the ropes when they might get a bit overwhelmed.
3. And finally, it can sometimes be a good confidence booster. MMORPGs are something I do put a lot of time into, so I tend to be really good at them, and that just feels good, especially when other people notice.

3.3 Themes Related to Lived Experience of Problematic Online Gaming Behaviors

Four themes and 13 subthemes emerged from the data analysis of the research question: What are adult MMORPG players' lived experiences of problematic online gaming behaviors? Pseudonym of participant and their produced quotes are presented in narrative format. The themes and frequency of thematic agreement (e.g., 67 references total) are presented for each corresponding theme in Table 3.

Table 3. Themes related to lived experience of problematic online gaming behaviors

Theme	Frequency of agreement
Preexisting psychopathology	$\sum = 9$
Maladaptive cognitions	$\sum = 8$
Behavioral symptoms	$\sum = 44$
Virtual-Friendship	$\sum = 6$

3.3.1 Preexisting Psychopathology

Participants described their lived experiences of MMORPG gameplay that were problematic. Three participants identified negative consequences of their online gaming. Preexisting psychopathology emerged as a theme for research question 2. Nine thematic references were produced in total for this theme. Three subthemes emerged: anxiety, depression, and attention-deficit hyperactivity disorder. Four thematic references for the subtheme anxiety were produced by two participants, one participant produced three references for the subtheme depression, while two participants produced two references for the subtheme attention-deficit hyperactivity disorder.

For the subtheme anxiety, Henry made two statements:

1. I'm very shy in real-life. I've had therapists who have said I have social anxiety, going up to other people and talking to them has always been difficult for me. I think video games have always been my default, so to speak. In other words because I

think I explained that poorly, since I know I always have video games available as a means to have fun or pass time, I think there's always been less of a pressure for me to actually go out and talk to other people.
2. For me personally, I think my entrenchment, so to speak, of my video game habits comes almost entirely from social anxiety. I actually really enjoy socializing and hanging out with other people, but actually being the person to go up to others and create those opportunities for myself has always felt like a huge wall for me, and video games are something I could always do by myself. If given the opportunity to hang out with other people instead of stay home and play games I will do that

Jacob, additionally, made two statements:

1. Online gaming increases my stress levels, both during and when I'm away.
2. Frustration, apathy towards life, anxiousness, hopelessness towards getting better, and overwhelmed with the tasks of everyday life.

For the subtheme depression, Jacob produced three references:

1. I feel unsatisfied pursuing goals in real-life.
2. Frustration, apathy towards life, anxiousness, hopelessness towards getting better, and overwhelmed with the tasks of everyday life.
3. I remember being depressed and feeling like I was just getting through life without any real purpose.

For the subtheme attention-deficit hyperactivity disorder, Archie stated, "I think it still affects my ability to study though, I have a very short attention span and get distracted easily. Something that really only seems to stop when I'm hooked on a game." Jacob made the statement, "I am always distracted and have trouble focusing outside of the game."

3.3.2 Maladaptive Cognitions

Participants described their lived experiences of MMORPG gameplay that were problematic. Four participants identified negative consequences of their online gaming. Maladaptive cognitions emerged as a theme for research question 2. Two subthemes emerged: anxious depression and loneliness. Eight thematic references were produced in total for this theme. Two thematic references for the subtheme anxious depression were produced by one participants, while three participants produced six references for the subtheme loneliness.

Jacob made the following two statements:

1. Frustration, apathy towards life, anxiousness, hopelessness towards getting better, and overwhelmed with the tasks of everyday life.
2. I've quit online games 6 months ago and I still have impulsive cravings. My heart rate increases, and I become distracted. I miss being able to achieve a state of flow. Life feels boring.

Thomas produced four statements:

1. If I'm the only one I know playing a game and never have met people in real-life I might not play as much.
2. I don't have people that just pop in for a visit where I live
3. I might not get as many invites to social gatherings but at my age more of those are couples things
4. I could see the current pandemic as also will cause more to play longer hours if they are in a hunker down local as a way to reduce the odds that one could get sick from it and still interact with others.

Henry stated, "As I've mentioned I think multiple times now, I personally really enjoy doing non-video game things as well, but most of the things I enjoy require other people, and the other people are always the hurdle I need to get over (as in getting a group of people to hang out with, not the people themselves)." Archie produced the reference, "I often consider quitting but I don't know what else I'd do, especially being home bound because of the Corona Crisis."

3.3.3 Behavioral Symptoms

Participants described their lived experiences of MMORPG gameplay that were problematic. All seven participants identified negative consequences of their online gaming. Behavioral symptoms emerged as a theme for research question 2. Eight subthemes emerged: (a) aggression or impulsive aggression, (b) deception, (c) displacement, (d) escape/mood modification, (e) intra- and interpersonal conflict, (f) negative consequences, (g) preoccupation, and (h) tolerance. Forty-four thematic references were produced in total for this theme.

Six thematic references for the subtheme aggression and impulsive aggression were produced by four participants. Archie produced three references:

1. In game I believe my behavior is more unpredictable than in real-life, I will fly off the handle faster than I would in real-life, both on chat and voice chat. Yes, I have less self-control when it comes to gaming. I'm more prone to swearing and cussing with people I know on voice chat, and with random strangers in text chat I'm faster to get angry when they make mistakes. I have less patience with people I don't see face to face basically.
2. Mostly boredom, playing games is how I fill most of my free time, when it's not an option I struggle with finding other things to do. That can lead to frustration after a while which results in me being more easily agitated.
3. I also can't deny that my lack of self-control in chat or voice chat is a genuine problem that despite trying, I can't seem to change.

Noah stated, "in-game, trolling, and harassment online continue to be an issue for me. Depends on the game, but I feel I am in a cycle where I cannot stop trolling others. Maybe it was because I feel harassed by other." Noah's use of the term trolling described intentional, deliberate actions by a player to provocative other players towards of ends

of irritating or angering the other player, while achieving pleasure from other players agitation.

Jacob recounted, "For a few years I have only had access to satellite Internet. This means that often the connection is so unstable that I cannot play even remotely competitively. I will still play even though I am frustrated and angry the entire time. Sometimes there would be no connection. If I had planned to play that night, and there was no connection, I would sit in front of the computer refreshing it every few minutes in the hope that it would come back on (even if the connection was as terrible as described above)."

Charlie mentioned, "It also sucked when co-workers would come to talk to me for way too long, while I had the game running. I would get really agitated and often rude at co-workers, so they would leave me alone, so I could continue to game."

Four references by three participants were captured for the subtheme deception. Jacob produced two statements:

1. I have worked from home for years now. I would try to limit my gaming in the evening when my wife was home. This means that I was primarily gaming instead of working or studying.
2. A recent example is when one of my dogs got sick. There was a spray medication that I had to use that was not easy. It's important to note that MMORPGs will often reward you for half-hearted efforts. I believe that I had, at that point, gotten so used to getting by with half-hearted efforts that I did the same with my dog's medication application. He got worse because of it, and we were told that we would have to put him on a harsher systemic medication that he might not make it through at his age. The vet phrased it as though the other stuff wasn't working, but I knew it was because I had only given quick applications without much effort and then gone back to gaming. The failures I've had that have been caused by gaming are the ones that have made me hate myself the most. The dog story ended okay. I recommitted, took progress photos, and we were able to avoid the harsher medication.

Thomas stated, "I have played games at the office during work hours, my monitor isn't something that is viewable to someone as soon as they come in and I have my sound off. I tend to do things that doesn't matter if I alt-tab the screen and take care of some issue for 10 to 15 min. From time to time it doesn't work out and will die in-game but employees almost never have any idea." Thomas's use of the term alt-tab describes a computer function native to Windows operating platforms to switch between active and inactive program applications, a feature of computer multi-tasking.

Archie recounted, "Hah, I definitely used to when I was younger because I didn't want to seem nerdy at school. But these days I don't hide it at all. I feel gaming especially amongst younger people is far more accepted than it was when I was 12 for example. Pretty much everyone I know knows that most of my time is spent on gaming, though I think a lot of them wouldn't know what a MMO was specifically. But I'd hide it to keep myself from being bullied anymore in high school."

The subtheme displacement contained 12 references produced by all seven participants. Archie provided four references:

1. I give up very easily in my other interests and hobbies, and often times things like daily quests will compel me to skip doing something so I can get my MMO chores done for the day.
2. There's always a slight fear of falling behind in the game I actively play at the time, so that takes precedent over other things like playing piano, guitar, or studying.
3. When I was younger, I'd often pass on seeing my friends in favour of gaming, luckily, I don't do that anymore.
4. From 18 to 21 I worked a part-time job at a grocery store, I hated the job and regularly called in sick just to play more World of Warcraft.

William produced two statements:

1. I'd opt out of going to dinner with family or hanging out with the few real-life friends I had.
2. When I was younger, I almost lost a job because the politics and immersion of the MMO I was playing was more important to me than anything else in my life.

Charlie provided two references:

1. I never had any hobbies or interests outside of gaming. I really am not interested in watching movies or reading. The outdoors isn't my thing.
2. When I got a really well-paying job I would play during work hours and just switch my screen to make it look like I was working on something else. That increased my anxiety because we worked in cubicles and anyone could come by at any moment. I would play with the sound off, which gave me anxiety because I use the audio cues to make sure I didn't die. It also sucked when co-workers would come to talk to me for way too long, while I had the game running. I would get really agitated and often rude at co-workers, so they would leave me alone, so I could continue to game.

Thomas recalled, "I don't have many hobbies or the ones I have had require shipping materials to where I live which can be expensive and require space, which is a rarity here. Typically, I have a computer that will play games already for work so the online games have been less of a cost and take up less space. Some hobbies that I have are all computerized and have expanded my knowledge on automating them and only have to fix issues from time to time."

Henry stated, "I think I've lost relationship opportunities because of my gaming habits, however I don't think I've ever lost an active relationship because of it. I've never lost a job with my habits, however I think procrastination in general has made my education and career opportunities worse."

Noah recounted, "Gaming was my first hobby and continues to be my primary one. Other hobbies or interests are pursued when I feel like it. The only issue I've experienced is within the hobby of gaming itself. Sometimes MMORPGs take time away from other games I'd like to play."

Jacob described, "Other activities are not as engaging as MMORPGs, nor as regularly rewarding. Because of these things, I struggle to do anything else. Engaging in other hobbies feels like a chore that I'm doing in the hopes that someday I will enjoy it."

Two participants with a total of three references produced the escape/mood modification subtheme. Archie opined, "From my isolated perspective gaming serves two purposes, fun and an escape, and if a child escapes into gaming rather than finding emotional support elsewhere it can have immense consequences on their life."

Jacob provided two statements:

1. If I'm at that point, however, and something happens in real-life, my usage spikes. It becomes an escape, and I justify it by saying that I just want to be happy for a bit. The longer that goes on, the greater the negative consequences. Quitting then becomes not only the desire to stop gaming, but also the avoidance of dealing with difficult challenges at a handicap. Not only a mental handicap because of how gaming affects my mind, but also a handicap in the sense that for weeks I will be behind, even if I am working and trying harder than somebody who is able to more steadily work towards their goals.
2. MMORPGs take you out of those negative real-life moments. It's been a common trend for me that when my real-life gets harder, I will turn to games. It acts as a negative feedback loop because the time and energy I put into games makes it more difficult to deal with those real-life problems. The burden was often taken on by my wife unknowingly, because I would hide how much time I spent gaming.

Intra- and interpersonal conflict subtheme has six references from three participants. William stated, "I'd opt out of going to dinner with family or hanging out with the few real-life friends I had." Jacob produced three statements:

1. I have been with my wife for 12 years, but we steadily grew apart during a couple years that I was playing MMORPGs. I would stop doing things with her. If I did, I would be distracted and immediately rush to the game after we finished. More importantly, the culture of gaming is different than the culture of real-life or other hobbies. I said some things and encouraged some behaviors that hurt her, and we realized that I had become somebody completely different. Our worlds had become very different. I quit the MMORPG and really struggled with it, despite the obvious fact that it was costing me the most important thing in my life.
2. My relationship with my parents has never recovered from the time I spent playing MMORPGs when I was in my mid-teens. That was 15 years ago. I almost lost my wife because of online games, and she would have been justified in leaving.
3. I have embarrassed myself in front of my peers presenting my research because of MMORPGs.

Charlie provided two statements:

1. It also sucked when co-workers would come to talk to me for way too long, while I had the game running. I would get really agitated and often rude at co-workers, so they would leave me alone, so I could continue to game.
2. I did lose multiple chances at having sex. I didn't realize until years later that a few people wanted to have sex with me, but I had such poor social skills and played

games so much that I missed their signals or would rush out of work or gatherings to play games.

The subtheme negative consequences was produced by three participants with 11 total references. Thomas stated, "I'm sure that if I spent then same amount of time working on a degree as did gaming it might of helped my career" Charlie produced three statements:

1. I would not make any real-life friends.
2. I even hurt my lower back, which required surgery given my weakened lower back muscles from laying down and playing games.
3. I did lose multiple chances at having sex. I didn't realize until years later that a few people wanted to have sex with me, but I had such poor social skills and played games so much that I missed their signals or would rush out of work or gatherings to play games.

Jacob provided seven statements:

1. I have been with my wife for 12 years but we steadily grew apart during a couple years that I was playing MMORPGs. I would stop doing things with her. If I did, I would be distracted and immediately rush to the game after we finished. More importantly, the culture of gaming is different than the culture of real-life or other hobbies. I said some things and encouraged some behaviors that hurt her, and we realized that I had become somebody completely different. Our worlds had become very different. I quit the MMORPG and really struggled with it, despite the obvious fact that it was costing me the most important thing in my life.
2. They sucked my time and made me think that I had my life more under control than I actually did.
3. If I had planned to play that night, and there was no connection, I would sit in front of the computer refreshing it every few minutes in the hope that it would come back on (even if the connection was as terrible as described above). During the heights of my addiction, I would do this rather than spend time with my wife or any other hobby.
4. I've quit MMORPGs twice. The first was when I was 16. At that point I had been playing 10 to 12 h per day. I was kicked out of school because I stopped going to school and moved out of my parents' house.
5. After selling everything else I owned, eating Nutella and instant coffee grounds for food, I had to sell my characters to pay rent. That let me quit.
6. I ended up attempting suicide 6 to 12 months later and on overdose-levels of drugs 1.5 years later. That's a separate story but I wanted to show that the MMORPG gaming had a long-term impact. It is difficult to recover from the time spent gaming, especially without the mental tools that comes with sobriety.
7. The second time was about six months ago. I have been with my wife for 12 years but we steadily grew apart during a couple years that I was playing MMORPGs. I would stop doing things with her. If I did, I would be distracted and immediately rush to the game after we finished.

It is of note that when Jacob stated sobriety, he is describing abstinence from online gameplay.

The subtheme preoccupation was resultant from two statements from two participants. Jacob described, Not only a mental handicap because of how gaming affects my mind, but also a handicap in the sense that for weeks I will be behind, even if I am working and trying harder than somebody who is able to more steadily work towards their goals.

Charlie stated, "I could not stop thinking about the game and I'd search out of game for gear and quests to make my character the best and most powerful he could be. I am definitely a min-maxer." Charlie used the term gear which is slang for in-game equipment used by an avatar, while his use of the term min-maxer refers to a gameplay style where the player seeks to minimize perceived unnecessary avatar attributes and maximize perceived essential avatar attributes based on player-defined goals.

Lastly, the subtheme tolerance was derived from two statements from two participants. Thomas opined, "I could see the current pandemic as also will cause more to play longer hours if they are in a hunker down local as a way to reduce the odds that one could get sick from it and still interact with others." Jacob recounted, "Initially I thought that an hour or so a day would be acceptable. An hour or so a day is not enough time to be competitive in an MMORPG. Usually that is just enough time to pick at the in-game chores. It generally creeps up to 3 to 4 h per day."

3.3.4 Virtual-Friendships

Participants described their lived experiences of MMORPG gameplay that were problematic. Four participants identified negative consequences of their online gaming. Virtual-friendship emerged as a theme for research question 2. Six thematic references for this theme were provided in total.

Henry produced two statements:

1. For me personally, I think my entrenchment, so to speak, of my video game habits comes almost entirely from social anxiety. I actually really enjoy socializing and hanging out with other people, but actually being the person to go up to others and create those opportunities for myself has always felt like a huge wall for me, and video games are something I could always do by myself. If given the opportunity to hang out with other people instead of stay home and play games I will do that
2. As I've mentioned I think multiple times now, I personally really enjoy doing non-video game things as well, but most of the things I enjoy require other people, and the other people are always the hurdle I need to get over (as in getting a group of people to hang out with, not the people themselves).

Archie produced two statements as well:

1. While the negative experiences are plentiful, I can't deny the fact that it's also how I met my ex-girlfriend and best friend.
2. I regularly wonder if I'd even have fun anymore if it wasn't for the friends I have made.

Jacob stated, "Online gaming is an opportunity to maintain connections with friends, especially those who have moved away." Charlie produced the reference, "With 24/7, global MMORPGS, there was always someone on. I would have friends on the east coast, west coast, and Australia that I'd play with and gain exp and build on our friendships. In real-life people sleep, have other obligations, or feel like I come on too strong and intense during the beginning of the relationship." When Charlie used the term exp he is referring to the abbreviation for avatar acquired in-game experience required to increase the level of the avatar.

3.4 Themes Related to Lived Experience of Attempts to Prevent Problematic Online Gaming Behaviors

Three themes emerged from the data analysis of the research question: What are adult MMORPG players' lived experiences of attempts to prevent problematic online gaming behaviors? Pseudonym of participant and their produced quotes are presented in narrative format. The themes and frequency of thematic agreement (e.g., 12 references total) are presented for each corresponding theme in Table 4.

Table 4. Themes related to lived experience of attempts to prevent problematic online gaming behaviors

Theme	Frequency of agreement
Boredom with online gameplay	$\sum = 4$
Limited access	$\sum = 5$
Treatment of problematic online gaming behaviors	$\sum = 3$

3.4.1 Boredom with Online Gameplay

Participants described their lived experiences of MMORPG gameplay that prevented problematic online gaming behaviors. Three participants identified occurrences in which their problematic online gaming behaviors momentarily abated or extinguished. Boredom with online gameplay emerged as a theme for research question 3. Four thematic references for this theme were provided in total.

Henry recalled, "I definitely, hands down, spend most of my free time playing games, but I also get bored of them a lot and spend time doing other things as well." Noah mentioned, "I've taken breaks from certain online games when there wasn't any new content".

Charlie produced two statements:

1. When you get really high level you usually need a group to get exp. Sometimes I am forced to take breaks, while waiting on others to log on or when you've spent hours waiting to groups. That's when I'll just log off and come back a few hours later.

2. Raids can be very frustrating, especially if you wipe or you are waiting for a rez. I'll just log off and wait for a guildie to text me when the raid is over and a rezzer logs on. Otherwise, it is boring as 'f' to sit there and see folks roll on no drop gear that you need.

When Charlie used the term exp he is referring to the abbreviation for avatar acquired in-game experience required to increase the level of the avatar. Charlie used the term raid, which is a massive group comprised of multiple groups and a term used to denote the activities done by the massive group. Charlie referred to wipe in his second statement, which is a term for when an entire group of avatars are temporarily dead in-game. Charlie used both the term rez and rezzers. The term rez is the abbreviation for resurrection, an in-game mechanic to revive a fallen avatar, while rezzer is slang for any avatar with the ability to revive a fallen avatar. When Charlie used the term roll he is referring to an in-game or out-of-game mechanism of producing a random number to distribute in-game items or equipment. Charlie used both the terms gear and no drop gear. Gear is a term for in-game equipment (i.e., weapons, armor, etc.) used to outfit avatars, while the term no drop gear describes an in-game mechanic that restricts transferring an in-game item between players.

3.4.2 Limited Access

Participants described their lived experiences of MMORPG gameplay that prevented problematic online gaming behaviors. Three participants identified occurrences in which their problematic online gaming behaviors momentarily abated or extinguished. Limited access emerged as a theme for research question 3. Five thematic references for this theme were provided in total.

William stated, "When I had a job that literally had me in the middle of California forests with no way to communicate with the outside world for weeks at a time".

Jacob made two statements:

1. I was kicked out of school because I stopped going to school and moved out of my parents' house. After selling everything else I owned, eating Nutella and instant coffee grounds for food, I had to sell my characters to pay rent. That let me quit.
2. I moved to single-player games. The effects were less so, but still similar and negative enough that I had to quit gaming entirely.

Charlie provided two references:

1. I was invited once on a cruise that I felt like I could not say no to. I stopped gaming for the first couple of days of travel
2. I moved to a rural village with really poor Internet and the latency made the game unplayable. I would die for reasons linked to the slow connection. I was basically forced to quit.

3.4.3 Treatment of Problematic Online Gaming

Participants described their lived experiences of MMORPG gameplay that prevented problematic online gaming behaviors. Three participants identified occurrences in which their problematic online gaming behaviors momentarily abated or extinguished. Treatment of problematic online gaming behaviors emerged as a theme for research question 3. Three thematic references for this theme were provided in total.

Archie produced the statement, "When I was 21, I realized I needed help and started intense group therapy 4 days a week, 8 h a day. It taught me to stop skipping out on things in favor of gaming. Therapy was a big part of it, along with the self-realization that I wasn't making any progress in real-life."

Jacob said, "Online support groups have been key and removing any ability to game impulsively." Charlie recounted, "I called a hotline trying to find help, but they only had one resource to give me. I ended up joining a forum and members there supported me. It gave me a sense of community similar to my gaming friends."

3.5 Themes Related to MMORPG Adult Gamers' Opinions of Prevention

Three themes emerged from the data analysis of the research question: What are adult MMORPG players' perspectives of how problematic online gaming behaviors might be prevented? Pseudonym of participant and their produced quotes are presented in narrative format. The themes and frequency of thematic agreement (e.g., 16 references total) are presented for each corresponding theme in Table 5.

Table 5. Themes related to MMORPG's adult gamers' opinions of prevention

Theme	Frequency of agreement
Gaining insight and awareness	$\sum = 4$
Developing support systems	$\sum = 4$
Treatment of underlying psychopathology	$\sum = 8$

3.5.1 Gaining Insight and Awareness

Participants described their perspectives of how to prevent problematic online gaming behaviors. Two participants opined given their lived experiences on how problematic online gaming behaviors might be prevented. Gaining insight and awareness emerged as a theme for research question 4. Four thematic references for this theme were provided in total.

Thomas stated, "I would also think some understanding they have that it might be a problem would also help and why they play so much." Jacob made three statements:

1. Education to parents and loved ones on the nature of addiction in the context of MMORPGs, the seriousness of it, and how to deal with it.

2. Somehow getting the addict into a mindset where they can clearly see the trend of their real-life and how it lines up with gaming.
3. Increased awareness, training, and research: during my gaming times I tried to get counseling twice and both times I was paired with gambling specialists who did not even know what an RPG was.

When Jacob used the term RPG he is using an acronym for role-playing game.

3.5.2 Developing Support Systems

Participants described their perspectives of how to prevent problematic online gaming behaviors. Four participants opined given their lived experiences on how problematic online gaming behaviors might be prevented. Developing support systems emerged as a theme for research question 4. Four thematic references for this theme were provided in total.

Thomas stated, "If they are playing games to interact with others that doing things with friends IRL or clubs where likeminded individuals could meet up and do things that isn't focused on online gaming." Thomas's reference to IRL is the abbreviation for "in real-life." Henry made the statement, "if friends and family reach out to people who they might suspect have some addiction to video games, it could help them get out more and away from potentially harmful habits." Archie offered, "Honestly? From my viewpoint it's almost 90% parenting. Parents have to be aware of how much time kids spend on the computer versus studying, spending time with friends, etc." Jacob opined, "Education to parents and loved ones on the nature of addiction in the context of MMORPGs, the seriousness of it, and how to deal with it."

3.5.3 Treatment of Underlying Psychopathology

Participants described their perspectives of how to prevent problematic online gaming behaviors. Five participants opined given their lived experiences on how problematic online gaming behaviors might be prevented. Treatment of underlying psychopathology emerged as a theme for research question 4. Eight thematic references for this theme were provided in total.

Thomas stated, "There will be some that still will need professional help". Henry made the statement, "helping people with social anxiety might encourage them to go out more, get away from games, and socialize with other people." Noah produced, "If someone's online gaming is affecting their life negatively, it's an addiction and should be treated/remedied as an addiction." Archie made two statements:

1. It's a dependency kids create; the constant level ups and dopamine hits just can't be found anywhere else short of. Drugs probably?
2. About a year of my therapy was 1 on 1 therapy directly focused on gaming addiction. By the end they helped me see that I was using gaming as an escape from real-life issues such as bullying and performance anxiety. That's when I started other forms of therapy to address the underlying issues.

Jacob offered three recommendations:

1. Online support groups have been key and removing any ability to game impulsively. I've noticed an increase in my ability to focus, but a decrease in my average happiness. I've also noticed a decrease in the variability of my mood.
2. Early intervention.
3. Removal of triggers, enablers, access

4 Discussion

Evaluation of the findings from seven study participants with lived experience of problematic online gaming behaviors was conducted. These findings were compared against recent, relevant literature on the topic and the theoretical framework of the Online Gameplay Motivations Theory (Yee 2006) and the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001). The emergence of themes was made possible through the framing of two theories that focus on separate aspects of problematic online gaming behaviors. With just the theoretical lens of Davis's (2001) model, there would have been a focus on problematic online gaming behaviors purely from a psychopathological standpoint. Yee's (2006) model provided a counterbalance to a purely psychopathological approach allowing for the emergence of themes of motivational factors behind problematic behaviors. The researcher of this study was not surprised at the findings as lived experiences captured by descriptive psychological phenomenology tends to contain both benefits and deficits associated with a phenomenon (Giorgi et al. 2017). However, there were surprises according to existing research found in this study.

4.1 What Are Adult MMORPG Players' Lived Experiences of Non-problematic Online Gaming?

The first research question asked: What are adult MMORPG players' lived experiences of non-problematic online gaming? The participant interviews produced three themes for research question one. Those themes were (a) improved access to and maintenance of relationships, (b) increased attention and focus, and (c) increased technology competency. Of the findings for research question one, improved access to and maintenance of relationships was not a surprise according to existing research, while both increased attention and focus and increased technology competency were surprises according to existing research.

Improved access to and maintenance of relationships was a finding. In this finding, adult MMORPG players recounted experiences where access to MMORPG virtual-worlds provided improved access to both real-life relationships and virtual-relationships. In addition, the ability to maintain those real-life relationships and virtual-relationships was described. Six participants interviewed produced 38 references that described establishing or maintaining real-life or virtual-relationships with friends, romantic partners, family members, and co-workers in MMORPG virtual-worlds. Otherwise, the participants would not have similar real-life opportunities to maintain current relationships or establish new relationships in real-life settings. With the current global pandemic,

restrictions on social gathering have increased the need for safe environments and settings for people to gather and socialize. Participants interviewed for this study noted how MMORPG virtual-worlds provided socialization during the global pandemic. According to the research literature, this finding was not a surprise.

Yee (2006) seminally reported in the first large scale investigation of MMORPG player demographics that 80% of MMORPG players played with a real-life romantic partner, family member, or friend on a regular basis, while 63.78% of females across all age groups played with a romantic male partner. More recently, Lee et al. (2016) and Mawer (2016) noted virtual-worlds of MMORPGs as a mainstream, culturally acceptable form of leisure and recreational activity where MMORPG players socialize and maintain relationships. Bergstrom et al. (2016) and Molesworth and Watkins (2016) found MMORPGs fostered positive social interactions without obligation to achieve in-game goals. Moreover, Estévez et al. (2017) and Snodgrass et al. (2016) uncovered social supports established in MMORPGs networks mitigated loneliness for individuals lacking real-world social support networks, while Kaufman et al. (2016) posited social supports found in MMORPGs were critical for older adults who may experience social isolation.

Improved access to and maintenance of relationships, is supported by Online Gameplay Motivations Theory as Yee (2006) postulated and found empirically that MMORPG players exhibit social motivation components with three subcomponents: socializing, relationship, and teamwork. The social motivation component of Yee's theory postulated MMORPG players desired to (a) chat and assist other players, (b) form lasting meaningful relationships with other players, and (c) participate in group efforts and derive satisfaction from such participation (Yee 2006). Five research teams (e.g., Billieux et al. 2015; Dalisay et al. 2015; Herodotou et al. 2014; Kardefelt-Winther 2014b) empirically validated social motivation was not associated with problematic online gaming behaviors, while Hagström and Kaldo (2014) found social motivation predicted non-problematic online gaming. This finding is supported by the Cognitive-Behavioral Model of Pathological Internet Use as two behavioral symptoms described are associated with relationships: (a) feelings that establishment and maintenance of friendship is only accessible on the Internet; and (b) isolation from real-world family and friends in favor of online friendships.

Adult MMORPG players shared accounts of increased attention and focus when engaged in online gameplay and when engaged in other technology-based or -accessed activities. This finding was a surprise with this study's population of adults between the ages of 18 and 40 years old engaged in online gameplay not related to business or work. Kaufman et al. (2016) studying older adult populations found enhanced cognitive capabilities given repetitive tasks involved in MMORPG gameplay. Hamlen (2018) and Robinson (2016) found increased attention and focus related to objective-focused team gameplay exclusively. Huotari and Hamari (2017); Landers et al. (2019) and Vesa et al. (2017) posited virtual-worlds are primed as spaces to organize and manage complex business organization that enhance task mastery, competency, and flow experience. Increased attention and focus are characteristics of flow experience (Huotari and Hamari 2017; Landers et al. 2019; Vesa et al. 2017). However, these studies involved online gameplay in business settings.

This finding is supported by Online Gameplay Motivations Theory given the finding that MMORPG players motivated by immersion and achievement experience increased attention and focus in-game by means of escapism as a fascination of the virtual-world persists (Hagström and Kaldo 2014; Yee 2006). This finding, additionally, is supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) as the preexisting psychopathology of attention-deficit hyperactivity disorder and obsessive-compulsive disorder are associated with increased attention, focus, and task completion. The Cognitive-Behavioral Model of Pathological Internet Use described the following behavioral symptoms associated with increased attention and focus: (a) obsessive thoughts about the specific application or activity on the Internet; (b) thinking about the specific Internet application or activity while offline; (c) investment of extreme amounts of time and monetary resources to access and continued engagement of the specific Internet application or activity; (d) diminished impulse control; and (e) inability to discontinue activities on the Internet. Additionally, Davis's (2001) model posits situational cues generated by the physical space games are played and in-game stimuli act as operant conditioning, which contributes to increased attention and focus.

Adult MMORPG players reported increase in their competency related to computer and Internet-based technology. Six out of seven of the adult MMORPG players interviewed were currently or previously employed in technology-related or technology-use-required professions. Adult MMORPG players reported increases in their technology competency or perceived technology competency by themselves or their potential employers due to their MMORPG gameplay. One adult MMORPG player interviewed believed he was hired for a technology-based job after disclosing during the job interview that he plays MMORPGs. This finding was a surprise as the research literature reviewed in this study does not reveal increased technology competency from playing MMORPGs. Taylor (2018) offers an alternative explanation to increased technology competency in postulating: growing up with the increasing exposure of personal computers and gaming consoles in the household is influential in developing technology competency for Xennials and generations thereafter.

This finding is not supported by Online Gameplay Motivations Theory (Yee 2006) as this theory focuses on players' motivations to play online games and offered no insight into increased technology competency of adult MMORPG players. This finding, additionally, is not supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) as the focus of this model is on the negative symptomology of pathological Internet use. Therefore, Davis's (2001) model does not address benefits associated with online gaming.

4.2 What Are Adult MMORPG Players' Lived Experiences of Problematic Online Gaming?

The second research question asked: What are adult MMORPG players' lived experiences of problematic online gaming behaviors? The participant interviews produced four themes and 13 subthemes for research question two. The four themes were (a) preexisting psychopathology, (b) maladaptive cognitions, (c) behavioral symptoms, and (d) virtual-friendships. The first theme, preexisting psychopathology included three subthemes: (a) anxiety, (b) depression, and (c) attention-deficit hyperactivity disorder. The

second theme, maladaptive cognitions, included two subthemes: (a) anxious depression and (b) loneliness. The third theme, behavioral symptoms, included eight subthemes: (a) aggression or impulsive aggression, (b) deception, (c) displacement, (d) escape/mood modification, (e) intra- and interpersonal conflict, (f) negative consequences, (g) preoccupation, and (h) tolerance. The fourth theme, virtual-friendships, did not included any subthemes. Of the findings for research question two, all findings were not surprising according to existing research.

Adult MMORPG players experienced symptomology of three disorders: (a) anxiety, (b) depression, and (c) attention-deficit hyperactivity disorder. This finding was not a surprise according to the literature base. Numerous research teams consistently found the presence of preexisting psychopathology in adult MMORPG players. Research teams that conducted recent studies found the presence of anxiety and depression (Andreassen et al. 2016; Evren et al. 2019a, 2020; Pearcy et al. 2017; Vadlin et al. 2016). Not including the aforenoted studies, seven research teams found the presence of just depression (Laconi et al. 2017; Lau et al. 2018; O'Farrell et al. 2020; Rho et al. 2018; Scerri et al. 2019; Strittmatter et al. 2015; Wang et al. 2018), while two research teams found the presence of just anxiety (González-Bueso et al. 2020; Wang et al. 2017). Therefore, 28 recent studies in total found anxiety and depression associated with problematic online gaming behaviors.

Eight research teams found the presence of attention-deficit hyperactivity disorder in MMORPG players (Andreaseen et al. 2016; Evren et al. 2019a, 2019b; Jeong et al. 2020c; Panagiotidi 2017; Pearcy et al. 2017; Vadlin et al. 2016; Yen et al. 2017). One study noted psychological disability, a more severe form of psychological distress, at a rate of 3% compared to 1% in their sample that experienced problematic online gaming behaviors (Pearcy et al. 2017). Psychological disability was recounted by two participants interviewed in this study. One participant is chronically unemployed and seeking vocational and employment services, while another attempted to commit suicide and received hospitalization and is currently undergoing ongoing treatment.

This finding is not supported by Online Gameplay Motivations Theory (Yee 2006) as this theory focuses on players' motivations to play online games and offered no insight into the preexisting psychopathology of adult MMORPG players. This finding is supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) as preexisting psychopathology is postulated as a necessary distal cause of specific pathological use of an application on the Internet on the etiological chain of this phenomenon. Davis (2001) posited that preexisting psychopathology such as depression, anxiety, attention-deficit hyperactivity disorder, and obsessive-compulsive disorder was a predisposed vulnerability which underlays specific pathological Internet use. The findings of this study found all of the implicated psychopathology except obsessive-compulsive disorder. However, there is symptomology overlap between the posited psychopathology that direct questioning, screening, or clinical assessment could implicate the presence of obsessive-compulsive disorder in the participant interviews.

Adult MMORPG players experienced characteristics of two types of maladaptive cognitions: anxious depression and loneliness. Participants recount experiences of anxious depression and loneliness prior to playing MMORPGs. In addition, participants recount experiences anxious depression and loneliness when not engaged in

MMORPG gameplay or preoccupied outside of gameplay with MMORPG-related activities. Adult MMORPG players are using MMORPG gameplay and MMORPG-related non-gameplay activities to cope with anxious depression and feelings of loneliness. This finding was not a surprise according to the literature base.

Research teams that conducted recent studies found the presence of both anxiety and depression associated with problematic online gaming behaviors (Andreassen et al. 2016; Evren et al. 2019a, 2020; Lau et al. 2018; Pearcy et al. 2017; Scerri et al. 2019; Vadlin et al. 2016). The confluence of anxiety and depression, in tandem, was found to be linked with problematic online gaming behaviors. The significant overlap of diagnostic criteria for anxiety and depression and common comorbidity are well-documented. There is strong emerging evidence underpinned by transdiagnostics in support of anxious depression (*e.g., comorbid anxiety and depression*; Choi et al. 2020; Rodriguez-Seijas et al. 2020; Seow and Gillan 2020).

Problematic online gaming behaviors has been found to be associated with higher levels of loneliness in seven recent journal articles (Kim et al 2016; Lemmens et al. 2015; Scerri et al. 2019; T'ng et al. 2020; Traş 2019; Wang et al. 2020a, 2020b), with one study using neuroimaging to demonstrate decreased connectivity from the pregenual anterior cingulate cortex to the laterobasal amygdala involved in mediating between problematic online gaming behaviors and loneliness (Wang et al. 2020b). Wang and colleagues' (2020b) amygdalar subdivisions research supports a neurobiological mechanism for the relationship between problematic online gaming behaviors and loneliness.

The finding loneliness is supported by Online Gameplay Motivations Theory as Yee (2006) postulated and found empirically that MMORPG players exhibit social motivation components to engage in social behaviors and thus protect against loneliness. The social motivation component of Yee's theory postulated MMORPG players desired to (a) chat and assist other players, (b) form lasting meaningful relationships with other players, and (c) participate in group efforts and derive satisfaction from such participation (Yee 2006). Kardefelt-Winther (2014b) used hypothesis-driven theory testing developed earlier by Shen and Williams (2011) that found escapism to be the strongest indicator of MMORPG players' feelings of loneliness ($\beta = 0.11$, $R^2 = 0.31$, $p < .001$). Both of these studies are unique in that they test MMORPG player motivations and a single psychological indicator either perceived stress (Kardefelt-Winther 2014b) or loneliness (Shen and Williams 2011).

The finding loneliness is supported by the Cognitive-Behavioral Model of Pathological Internet Use as maladaptive cognitions is the central factor implicated in specific pathological Internet use, which include ruminative and depressogenic cognitive styles. In the etiological chain this central factor is the manifested cognitional element which must be present. These maladaptive cognitive styles are seen in disorders of depression, anxiety, attention-deficit hyperactivity, and obsessive-compulsive, which Davis (2001) describes initially in the distal necessary cause of preexisting psychopathology. Lehenbauer-Baum et al. (2015), Pontes (2017), Sioni et al. (2017) and Subramaniam et al. (2016) suggested social anxiety in online gamers contributed to loneliness; while low self-esteem was suggested by Lemmens et al. (2015) and Scerri et al. (2019), low self-worth by Beard and Wickham (2016), and low self-efficacy by Ahsan et al. (2019) as contributors to loneliness.

Adult MMORPG players experienced eight types of behavioral symptoms: (a) aggression or impulsive aggression, (b) deception, (c) displacement, (d) escape/mood modification, (e) intra- and interpersonal conflict, (f) negative consequences, (g) preoccupation, and (h) tolerance. This finding was not a surprise according to the literature base. Adult MMORPG players recounted experiences where they demonstrated aggression or impulsive aggression in-game and out-of-game. Adult MMORPG players described intentionally making verbal personal attacks towards other players inside virtual-worlds on the bases of reasons not related to gameplay or in-game activities. Adult MMORPG players described impulsive aggression to co-workers and family members when approached by others during gameplay; thus, interrupting gameplay.

Similar studies have found aggression or impulsive aggression associated with problematic online gaming behaviors (Bargeron and Hormes 2017; González-Bueso et al. 2020; Jeong et al. 2020a, 2020c; Kim et al. 2016, 2017; Rho et al. 2018; T'ng et al. 2020). T'ng et al. (2020) uncovered physical aggression, verbal aggression, anger, and hostility as distinct types of aggression experienced by MMORPG players. Aggression has been found to be significantly associated with feelings of loneliness, social skills deficits, and interpersonal communication skills deficits (T'ng et al. 2020).

The finding aggression or impulsive aggression is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to this finding. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The finding aggression or impulsive aggression was assumed by Davis and described in his fifth behavioral symptom (e.g., diminished impulse control).

Adult MMORPG players recounted deceiving partners, spouses, family, and friends to continue engaging directly or indirectly with MMORPGs. Likewise, 13 studies found deception associated with problematic online gaming behaviors; however, the literature base is divergent (Chen et al. 2020; Gomez et al. 2019; Király et al. 2017; Koo et al. 2017; Kurnianingsih et al. 2018; Lemmens et al. 2015; Müller et al. 2019; Pearcy 2019; Pearcy et al. 2016, 2017; Pontes et al. 2019; Rehbein et al. 2015; Schivinski et al. 2018). Five studies found good predictive rate, accuracy, and specificity for deception (Koo et al. 2017; Kurnianingsih et al. 2018; Pearcy 2019; Pearcy et al. 2016, 2017), while eight studies opposed these findings (Chen et al. 2020; Gomez et al. 2019; Király et al. 2017; Lemmens et al. 2015; Müller et al. 2019; Pontes et al. 2019; Rehbein et al. 2015; Schivinski et al. 2018), while two studies only found as a strong indicator of severe problematic online gaming behaviors (Gomez et al. 2019; Rehbein et al. 2015). Overall, the recent literature base is divided seven to eight studies for deception as an indicator of problematic online gaming behaviors.

The finding deception is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to this finding. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The

finding deception was assumed by Davis and described in his fourteenth behavioral symptom (e.g., secrecy and deception around time investment in the specific application or activity on the Internet).

Adult MMORPG players described experiences where MMORPGs was their sole form of leisure and recreation; therefore, displacing all other forms of previous leisure, social, and recreation. Furthermore, several interviewees described growing up with MMORPGs and not engaging in or actively avoiding any other leisure, social, and recreational activities. Displacement is generally described and infrequently investigated in the literature base. No recent study found in the literature base provided insight into the quality of displacement experienced by MMORPG players. The findings of this study captured, beyond the presence of displacement, in-depth accounts of how adult MMORPG players are avoiding other activities to continue MMORPG gameplay and MMORPG-related activities.

The finding displacement is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to this finding. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The finding displacement was assumed by Davis and described in his tenth and eleventh behavioral symptoms. Davis's (2001) tenth behavioral symptom is spending less time doing previously pleasurable and enjoyable activities, while his eleventh behavioral symptom is no longer finding pleasurable or enjoyable previous activities.

Adult MMORPG players recounted using MMORPGs to escape from reality and real-world obligations and problems. Adult MMORPG players also described using MMORPGs to modify their mood. Mood of those interviewed ranged from anxious, depressed, angry, to irritable.

The finding escape/mood modification is supported by Online Gameplay Motivations Theory as Yee (2006), while this finding is not supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001). Immersion is one of three primary motivation components containing discovery, role-playing, customization, and escapism as subcomponents described by Yee. Escapism refers to avoiding thinking and engaging in real-life problem by means of using the online environment (Yee 2006). Granted multiple studies show achievement motivation component can be associated with problematic online gaming behaviors, the immersion motivation component is more strongly associated (Hagström and Kaldo 2014; Kardefelt-Winther 2014b; Kuss et al. 2012).

A multiple regression analysis of the Problematic Usage Scale, conducted by Yee (2006) revealed that the escapism subcomponent of the motivation component immersion ($\beta = .31$, $R^2 = .34$, $p < .001$), hours played per week ($\beta = .30$, $R^2 = .34$, $p < .001$), and the advancement subcomponent of the motivation component achievement ($\beta = .17$, $R^2 = .34$, $p < .001$) were the strongest predictors of problematic online gaming behaviors. Kuss et al. (2012) found problematic online gaming behaviors were equally explained by the subcomponents escapism of the immersion motivation at $\beta = .36$, $R^2 = .46$, $p < .01$ and the subcomponent mechanics of the achievement motivation at $\beta = .21$, R^2

= .46, p < .01. Kuss et al. (2012), additionally, found that time spent gaming per week was strongly associated with problematic online gaming behaviors.

Pearson correlation from Yee's (2006) study between self-report and the Motivation to Play in Online Games Questionnaire uncovered that the escapism subcomponent (β = .31, R^2 = .31, p < .001) of the motivation component immersion was the second strongest predictors (R^2 = .303, p < .005) of problematic online gaming behaviors (Deleuze et al. 2018). Yee's (2006) findings directed three separate researcher team (Hagström and Kaldo 2014; Kardefelt-Winther 2014b; Kuss et al. 2012) to focus on the escapism subcomponent of immersion, which lead to confirmation that escapism has a stronger associations with problematic online gaming behaviors.

Hagström and Kaldo (2014) developed a deeper understanding of escapism in their acknowledgment of the importance of the immersion motivation. This research team postulated that Yee's original construct for escapism was measuring different concepts (Hagström and Kaldo 2014). Hagström and Kaldo (2014) uniquely divided escapism into positive and negative, whereas positive escapism was defined as a fascination of the virtual-world and negative escapism was defined as avoidance of real-life problems. This terminology development was precipitated by their finding that Yee's (2006) 39-item Gameplay Motivations Scale had low construct validity, internal consistency, and low reliability (α = .65) for its measurements of escapism (Hagström and Kaldo 2014).

Given the deeper understanding of escapism, Hagström and Kaldo (2014) found that escapism explains 49% of the variance of problematic online gaming behaviors compared to Yee's (2006) findings of 31% of the variance. In contrast, Yee (2006) originally found achievement as the strongest indicator at 34% with immersion coming in at a close second strongest at 31%, while Hagström and Kaldo (2014) found that immersion motivation by isolating the escapism subcomponent explained 49% of the variance of problematic online gaming behaviors. This was tested by surveying 201 MMORPG players (92% male, M_{age} = 23) using Yee's (2006) original measures for escapism and the delineated positive and negative escapism constructs they developed (Hagström and Kaldo 2014).

Hagström and Kaldo's (2014) study uncovered a strong correlation with negative escapism and MMORPG players' level of psychological distress (r(141) = .49, p < .01) than Yee (2006) originally found (r(141) = .21, p < .05). The scale for negative escapism, developed by Hagström and Kaldo (2014), was found to be more reliable (α = .85) than Yee's (2006) scale for escapism (α = .65). This research team ultimately called for a more direct and precise measurement and analysis of the subcomponent escapism of the immersion motivation.

Kardefelt-Winther (2014b) hypothesized an individual's level of stress was moderated by a relationship between the escapism subcomponent and problematic online gaming behaviors. To test this hypothesis, this researcher administrated an online questionnaire to 702 MMORPG players (89% male, M_{age} = 24; Kardefelt-Winther 2014b). His findings found a strong interaction between perceived stress and escapism (β = .88, R^2 = .27, p < .01) and concluded a compounding effect due to high stress levels and negative escapism (Kardefelt-Winther 2014b). Multiple regression analyses indicate between 27% (Kardefelt-Winther 2014b) and 49% (Hagström and Kaldo 2014) of

the total variance of problematic online gaming behaviors can be explained through the immersion motivation.

No study to date found non-problematic online gaming outcomes for MMORPG players who are motivated by immersion. In fact, both immersion and achievement have been found to be the strongest indicators of problematic online gaming behaviors (Beard and Wickham 2016; Billieux et al. 2013, 2015; Colder Carras et al. 2017; Deleuze et al. 2018; Hagström and Kaldo 2014; Herodotou et al. 2014; Hussain et al. 2015; Kahn et al. 2015; Kardefelt-Winther 2014b; Kuss et al. 2012).

Adult MMORPG players reported conflict, both intrapersonal and interpersonal, in their relationships as a cause of MMORPG gameplay and MMORPG-related activities. Adult MMORPG players as a result of intra- and inter-personal conflict have jeopardized or lost a relationship, job, or educational or career opportunity. Adult MMORPG players shared ending or nearly romantic relationships and marriages due to their problematic online gaming behaviors. Adult MMORPG players described interpersonal conflicts that resulted in difficulty gaining employment, difficulty maintaining employment, and loss of employment.

Likewise, intra- and inter-personal conflict was noted in seven studies. Müller et al. (2019), Rikkers et al. (2016), and Strittmatter et al. (2015) found positive association between intra- and inter-personal conflict and problematic online gaming behaviors, while Bonnaire et al. (2019), Bonnaire and Phan (2017), and Zorbaz et al. (2015) found across four studies interfamilial conflict positively associated with problematic online gaming behaviors. Problems in interfamily relationships were similarly found in this study.

The finding intra- and inter-personal conflict was not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to this finding. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The finding intra- and interpersonal conflict was assumed by Davis and described in his fourth behavioral symptom (e.g., investment of extreme amounts of time and monetary resources to access and continued engagement of the specific Internet application or activity).

Adult MMORPG players described continuing to play MMORPGs despite negative consequences of their online gameplay and resultant problematic online gaming behaviors. Adult MMORPG players reported being aware of these negative consequences, yet still investing time into MMORPGs and MMORPG-related activities. Adult MMORPG players continued to play MMORPGs at the expense of their marriage and romantic relationships. A suicide attempt was reported by an adult MMORPG interviewed for this study related to an ultimatum his wife gave regarding his online gameplay or their marriage. Alternative terms for negative consequences found in the literature are continued use and problems.

Similarly, Chang et al. (2018) and Przybylski et al. (2017) found MMORPG players invested time into online gaming to ease stress caused by various real-life issues or problems even when their time investment in and personal attachment to MMORPGs

generated new or perpetuated prior real-life issues or problems. Time investment in MMORPGs has led to neglect and repudiation of schooling, employment, relationships, childrearing, and health (Király et al. 2017; Lee et al. 2017; Spragg 2017). News media has reported death by exhaustion and dehydration for adults that binge play at these levels for consecutive days on end (CNN 2015; Spragg 2017). Moreover, crimes including severe child neglect, infant death, and homicide have been committed to continue to play MMORPGs (Denham and Spokes 2019; Rowlands et al. 2016; Spragg 2017). Suicide has additionally been reported for MMORPG players who experienced in-game death, penalties, and hardships and who had restricted access to play MMORPGs (Spragg 2017). One participant of this study described the threat of divorce from his spouse, his suicide attempt, and the near death of the family dog due to him neglecting to administer medication. Nonetheless, it was not until his suicide attempt and hospitalization, did he receive treatment.

The finding negative consequences is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to negative consequences. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The finding negative consequences were assumed by Davis and described in his fourth and sixth behavioral symptoms (e.g., investment of extreme amounts of time and monetary resources to access and continued engagement of the specific Internet application or activity; diminished self-worth).

Adult MMORPG players recounted their preoccupation with MMORPGs. Adult MMORPG players described being preoccupied with MMORPGs when at work, when socializing with others, and when attempting to sleep. Adult MMORPG players reported their preoccupation with MMORPGs impairing seeking employment, job performance, and academic performance. Adult MMORPG players described their preoccupation with MMORPGs impairing social relationships and interactions as the only subject of interest of theirs' is their MMORPG of choice.

Likewise, 10 studies found preoccupation associated with problematic online gaming behaviors (Aaresth et al. 2017; Dullur and Starcevic 2018; Griffiths et al. 2016b; Kuss et al. 2017a, 2017b; Lopez-Fernandez 2018; Müller et al. 2019; Petry et al. 2016; Pietersen et al. 2018; Saunders et al. 2017). Lopez-Fernandez (2018) and Pietersen et al. (2018) reported adults experience preoccupation outside of gameplay, while seven studies asserted preoccupation should be used to demarcate non-problematic use from problematic use (Aaresth et al. 2017; Dullur and Starcevic 2018; Griffiths et al. 2016b; Kuss et al. 2017a, 2017b; Petry et al. 2016; Saunders et al. 2017). Therefore, preoccupation with MMORPGs should be a necessary feature of problematic online gaming behaviors and diagnostic criteria for gaming related disorders.

The finding preoccupation is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to preoccupation. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Behavioral symptoms are necessary proximal causes implicated in specific pathological

Internet use (Davis 2001). In total, Davis (2001) outlined 14 behavioral symptoms. The finding preoccupation was assumed by Davis and described in his first, second, and third behavioral symptoms. Davis's (2001) first behavioral symptom is obsessive thoughts about the specific application or activity on the Internet. Davis's (2001) second behavioral symptom is thinking about the specific Internet application or activity while offline. Davis's (2001) third behavioral symptom is anticipation of future occasion to engage in the application or activity on the Internet.

Adult MMORPG players described increased tolerance related to MMORPG gameplay in an effort to play competitively or keep up with the progress of other MMORPG players. Adult MMORPG players reported time investment increase related to pacing with other MMORPG players in order to continue to socialize with their group or party members, virtual-friendships, and guild members. Likewise, Lopez-Fernandez (2018) and Pietersen et al. (2018) reported adults experience the need to increase the amount of time spent gaming to feel excitement and satisfaction. Overall lower levels of life satisfaction resulting from increased online gameplay was reported by four studies (Bargeron and Hormes 2017; Lehenbauer-Baum et al. 2015; Lemmens et al. 2015; Subramaniam et al. 2016).

The finding tolerance is not supported by Online Gameplay Motivations Theory as Yee (2006); therefore, Yee's theory lends no perspective to tolerance. Majority of findings were supported by the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) apart from the findings of escape/mood modification and tolerance. Therefore, Davis's model lends no perspective to tolerance as well.

Virtual-Friendship was a finding for research question two. Adult MMORPG players who maintain virtual-friendships in-game are consequently experiencing problematic online gaming behaviors. The virtual-worlds of MMORPG provide a unique setting that influences how virtual-friendships are formed and maintained. MMORPGs brings together hundreds of thousands of gamers to work towards goals, role play, and compete against each other in large virtual-communities that transcend geographical and temporal restrictions. MMORPG players live in most if not all nations throughout most if not all time zones. As a consequence, MMORPG players are required to increase time investment in gameplay to be online during different time zones to form and maintain virtual-friendships. This finding was not a surprise according to the literate base.

There is limited research linking problematic online gaming behaviors and virtual-friendships as most studies contextualize the outcome as a benefit not a detriment. King et al. (2016), Kuss (2017), and Lopez-Fernandez (2018) uncovered that time spent in-game was increased due to the desire of players to establish and maintain virtual-friendships. Additionally, these same researchers noted preoccupation with MMORPGs extended beyond gameplay as these virtual-friendships were sustained on MMORPG-related online gaming forums and private social networking groups (King et al. 2016; Kuss 2017; Lopez-Fernandez 2018). Otherwise, this finding and associated negative consequence is not directly discussed in recent studies.

The finding virtual-friendship is supported by Online Gameplay Motivations Theory as Yee (2006) postulated and found empirically that MMORPG players exhibit social motivation components to engage in social behaviors online and within virtual-worlds. The social motivation component of Yee's theory postulated MMORPG players desired

to (a) chat and assist other players, (b) form lasting meaningful relationships with other players, and (c) participate in group efforts and derive satisfaction from such participation (Yee 2006). Yee (2006) did not determine if friendships were established initially in virtual-worlds; thus, supporting this finding directly. Yee (2006) did find 80% of MMORPG players play with a real-life romantic partner, family member, or friend on a regular basis.

The finding virtual-friendship is supported by the Cognitive-Behavioral Model of Pathological Internet Use. This model posits behavioral symptoms as a necessary proximal factor implicated in specific pathological Internet use (Davis 2001). Davis (2001) conceptualized, without polytheistic taxonomical thresholds, two behavioral symptoms related to this finding: (a) feelings that establishment and maintenance of friendship is only accessible on the Internet; and (b) isolation from real-world family and friends in favor of online friendships.

4.3 What are Adult MMORPG Players' Lived Experiences of Attempts to Prevent Problematic Online Gaming Behaviors?

The third research question asked: What are adult MMORPG players' lived experiences of attempts to prevent problematic online gaming behaviors? The participant interviews produced three themes for research question three. Those themes were (a) boredom with online gameplay, (b) limited access, and (c) treatment of problematic online gaming behaviors. Of the findings for research question three, both limited access and treatment of problematic online gaming behaviors were not surprising according to existing research, while boredom with online gameplay was a surprise according to existing research.

Adult MMORPG players reported successful attempts to prevent problematic online gaming behaviors were due to feelings of boredom with their chosen MMORPG. This finding was a surprise as the research literature reviewed in this study does not reveal boredom associated with abatement or extinguishment of problematic online gaming behaviors. Boredom is exclusively mentioned in relations to the precipitation and perpetuation of problematic online gaming behaviors (King et al. 2016; Lopez-Fernandez 2018; Pietersen et al. 2018). In other words, MMORPGs are played to alleviate feelings of boredom, but not boredom as a means to discontinue playing online games.

The Online Gameplay Motivations Theory (Yee 2006) lends perspective to this finding with majority of the motivation components and subcomponents. The motivation achievement contains two relevant subcomponents advancement and competition which provides insight into this finding. If adult MMORPG players no longer are able to either (a) accumulate in-game power, wealth, prestige, or related symbols (e.g., advancement) nor (b) challenge and compete directly or indirectly with other players on measures of in-game dimensions (e.g., competition) MMORPG players may feel bored with their chosen MMORPG.

Alternatively, the motivation social contains one subcomponent teamwork which provides insight into this finding. If adult MMORPG players no longer derive satisfaction from participating in group efforts feelings of boredom may arise. The motivation immersion instead provides another possible perspective into this finding with the subcomponents discovery and escapism. If adult MMORPG players no longer (a) derive

satisfaction from finding and knowing aspects in-game and game-related which other players do not know (e.g., discovery), (b) have exhausted in-game content and are awaiting new in-game content (e.g., discovery), or (c) are able to avoid thinking and engaging in real-life problem by means of using the online environment (e.g., escapism) then feelings of boredom may occur.

The Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) lends minimal insight into this finding. Davis's (2001) model focuses on the negative symptomology of pathological Internet use. Davis's (2001) model, therefore, does not directly describe prevention. However, it can be inferred that if the necessary and sufficient factors on the etiological chain abate or extinguish either consequentially or intentionally than adult MMORPG players may become bored with playing online games. Necessary and sufficient factors include (a) preexisting psychopathology, (b) behavioral symptoms, (c) maladaptive cognition, and (d) exposure to technology.

Adult MMORPG players reported successful attempts intentional or otherwise to prevent problematic online gaming behaviors when access was limited to their chosen MMORPG, computer technology, or Internet access. Adult MMORPG players described instances when either their chosen MMORPG reached end-of-life, was offline temporarily, or was inaccessible (i.e., monetarily, account access, account banning, etc.). Additionally, adult MMORPG players described instances when access to computer technology (i.e., desktop, laptop, gaming station, etc.) was inaccessible or insufficient to play online games. Furthermore, adult MMORPG players described instances when Internet access was inaccessible, insufficient, or cost prohibitive in order to continue online gameplay. This finding was not surprise as the research literature reviewed on treatment of problematic online gaming behaviors often restricts or limits access to online games. Milieu settings are primary treatment modality for problematic online gaming behaviors, where five research teams noted the immediate, short-term efficacy of removing access to computer technology by removing the individual from their setting (Nazlıgül et al. 2018; Rho et al. 2018; Sakuma et al. 2017; Varma 2018; Zajac et al. 2017). However, milieu settings have shown no efficaciousness in the long-term abatement and extinguishment of Internet addiction and problematic online gaming behaviors beyond the temporary removal of access to the Internet and computer technology (Nazlıgül et al. 2018; Rho et al. 2018; Zajac et al. 2017).

This finding is not supported by Online Gameplay Motivations Theory (Yee 2006) as this theory focuses on players' motivations to play online games and offered no insight into limiting access to computer technology for adult MMORPG players. This finding is supported by the Cognitive-Behavioral Model of Pathological Internet Use. This model posits exposure to technology as a necessary and sufficient distal factor and situational cues as a contributory distal factor implicated in specific pathological Internet use (Davis 2001).

Davis (2001) conceptualized that access to and experience using the Internet is a requirement for problematic online gaming behaviors, because, firstly, the activity and application pathologically used must be accessed via the Internet and, secondly, removal of access to the Internet minimally abated specific pathological Internet use. However, removal of access to the Internet is sufficient to extinct problematic online gaming behaviors. In other words, if there is no Internet then an individual cannot play online

games to develop and continue demonstrating problematic online gaming behaviors. Nevertheless, exposure to technology is additionally a contributory cause as it is the catalyst in the development of specific pathological Internet use.

Davis (2001), further, posited the normal process of operant conditioning contributes to the maintenance of associated cognitions and behaviors by means of situational cues. Situational cues provide stimulus associated with online activities and therefore additionally acts as secondary reinforcement. It is, therefore, conceivable that the removal of situational cues via limiting or restricting access to MMORPGs could aid in prevention of problematic online gaming behaviors. However, this alone would not be sufficient given the contributory nature of this conditioning.

Adult MMORPG players reported participation in therapy that addressed problematic online gaming behaviors. Only one participant recounted his experience of seeking and receiving treatment for problematic online gaming behaviors. This interviewee disclosed that it was difficult to find a specialist to treat problematic online gaming behaviors. This led to unfavorable referrals to treatment that focused on pathological gambling or other psychopathology. This interviewee described his struggle with the therapist not understanding gamer culture, gaming terminology, and associated gaming technology. The study participant recounted being hospitalized for a suicide attempt related to his problematic online gaming behaviors, undergoing intensive outpatient treatment with a pathological gambling program, and current vocational rehabilitation to address his chronic unemployment related to his problematic online gaming behaviors. The study participant disclosed current unemployment, abstinence from MMORPG and other online and offline games, and receiving vocational rehabilitation services.

Other study participants only opined about treatment of problematic online gaming behaviors as a form of prevention, abatement, and extinguishment. None lent perspective or had experiences with effective treatment modalities. This finding was not a surprise as treatment modalities for problematic online gaming behaviors, Internet gaming disorder, Internet addiction, and technology-based addictions are investigated in recent research literature.

Milieu and residential treatment (Nazlıgül et al. 2018; Rho et al. 2018; Zajac et al. 2017), digital detox boot camps (Varma 2018), self-discovery camps (Sakuma et al. 2017), parent-mediated treatment (Bonnaire et al. 2019), transdiagnostic treatment (Choi et al. 2020), cognitive behavioral therapy (Sakuma et al. 2017), and craving behavioral group-based intervention (Zhang et al. 2016) are empirically studied treatment modalities recently investigated in the literature base, which range from experimental, probably efficacious, and well-established treatments (Zajac et al. 2017).

This finding is not supported by Online Gameplay Motivations Theory (Yee 2006) as this theory focuses on players' motivations to play online games and offered no insight into treatment of problematic online gaming behaviors for adult MMORPG players. This finding is supported by the Cognitive-Behavioral Model of Pathological Internet Use. Davis's (2001) model in its entirety lends perspective to the treatment of problematic online gaming behaviors due to its focus on describing the negative symptomology and postulating the etiological chain of pathological Internet use. Whether directly, indirectly or intentionally, unintentionally researchers and therapists are addressing elements of Davis's proposed etiological chain when treating problematic online gaming behaviors.

4.4 What Are Adult MMORPG Players' Perspectives of How Problematic Online Gaming Might Be Prevented?

The fourth research question asked: What are adult MMORPG players' perspectives of how problematic online gaming behaviors might be prevented? The participant interviews produced three themes for research question four. Those themes were (a) gaining insight and awareness, (b) developing support systems, and (c) treatment of underlying psychopathology. Of the findings for research question four, all findings were not surprising according to existing research.

Adult MMORPG players, given their lived experiences, opined insight and awareness of problematic online gaming behaviors might prevent such behaviors. Adult MMORPG players may be able to prevent problematic online gaming behaviors through gaining insight into their own or others' behaviors or experiences. Furthermore, adult MMORPG players may be able to prevent problematic online gaming behaviors through awareness campaigns. According to the research literature, this finding was not a surprise. King and Delfabbro (2017) summarized recent developments in policy and prevention for problematic online gaming across seven countries (e.g., USA, UK, Australia, Germany, China, Japan, South Korea). However, majority of the prevention work was aimed at school settings (Dau et al. 2015; King and Delfabbro 2017).

King and Delfabbro (2017) urged for the need to evaluate the efficacious of prevention strategies to identify the overall impact. It was noted that East Asian countries led recent efforts to measure prevention program efficacy and impact (King and Delfabbro 2017). Dau et al. (2015) and King and Delfabbro (2017) documented the addiction help system used by Germany that develops prevention campaigns to bring awareness of problematic online gaming behaviors.

Additionally, multiple commercial websites have arisen with information, self-tests, consultation chats, and brief self-help interventions and tools to elucidate problematic online gaming behaviors to the general public (Dau et al. 2015). It is unknown what percentage of those individuals who use these services access treatment. In addition, homepages of individuals and their families impacted by problematic online gaming behaviors are available that provides information by means of lived experiences and resources to the general public (Dau et al. 2015). The WHO (2015) has recently committed to collecting and disseminating information on the excessive use of Internet, computers, and smartphones to bring awareness to problematic online gaming behaviors.

Neither the Online Gameplay Motivations Theory (Yee 2006) nor the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) lends any perspective to this finding. Yee's theory focuses on players' motivations to play online games, while Davis's (2001) model focuses on the negative symptomology of pathological Internet use. Neither of these theorists directly opined on prevention of problematic online gaming behaviors. Moreover, inferences cannot be made from either of these theories relevant to adult MMORPG players gaining insight and awareness of problematic online gaming behaviors.

Adult MMORPG players opined natural, social, therapeutic, and institutional support systems might prevent problematic online gaming behaviors. According to the research literature, this finding was not a surprise. Rikkers et al. (2016) noted chat rooms and social media were effective environments to develop support systems.

Bonnaire et al. (2019) investigated parent-mediated treatment as a means to strengthen natural support systems of MMORPG players, while confirming results from previous studies that (a) parental attitudes, (b) parental monitoring, (c) family functioning, (d) family cohesion, (e) family harmony, (f) parental regulated access to online games, and (g) parental banning of online games each influenced problematic online gaming behaviors (Bonnaire and Phan 2017; Kim and Kim 2015; Rikkers et al. 2016; Zorbaz et al. 2015). Kim and Kim (2015) uncovered that MMORPG players perception of supportive natural support systems influenced their online gaming behaviors. Zorbaz et al. (2015) noted that adults' level of education does not adversely impact their ability to support their family members, while Rikkers et al. (2016) noted unemployment, households in public housing, and blended family environment adversely impacts natural support systems aiding MMORPG players.

Neither the Online Gameplay Motivations Theory (Yee 2006) nor the Cognitive-Behavioral Model of Pathological Internet Use (Davis 2001) lends any perspective to this finding. Yee's theory focuses on players' motivations to play online games, while Davis's (2001) model focuses on the negative symptomology of pathological Internet use. Neither of these theorists directly opined on prevention of problematic online gaming behaviors. Moreover, inferences cannot be made from either of these theories relevant to developing support systems.

Treatment of underlying psychopathology was a finding. This finding initially revealed adult MMORPG players were aware of underlying and co-occurring psychopathology associated with problematic online gaming behaviors. Further, this finding revealed adult MMORPG players opined treatment of underlying psychopathology might prevent problematic online gaming behaviors. According to the research literature, this finding was not a surprise.

Between 2015 and 2020, 40 studies uncovered underlying psychopathology which impacted adult MMORPG players experiencing problematic online gaming behaviors including:

- anxious depression (Andreassen et al. 2016; Bargeron and Hormes 2017; Evren et al. 2019a, 2020; Jo et al. 2017; King and Delfabbro 2016; Lau et al. 2018; Lehenbauer-Baum et al. 2015; Lemos et al. 2016; Männikkö et al. 2015; Müller et al. 2019; Na et al. 2017; Pearcy et al. 2017; Stockdale and Coyne 2018; Vadlin et al. 2016; Wartberg et al. 2017; Wu et al. 2018),
- anxiety (Laconi et al. 2017; Lau et al. 2018; O'Farrell et al. 2020; Rho et al. 2018; Scerri et al. 2019; Strittmatter et al. 2015; Wang et al. 2018),
- depression (González-Bueso et al. 2020; Wang et al. 2017),
- personality traits (Evren et al. 2019a, 2019b, 2020; Lehenbauer-Baum and Fohringer 2015; Lehenbauer-Baum et al. 2015; Vadlin et al. 2016; Wang et al. 2015),
- general psychological distress and psychological disability (Jo et al. 2017; Király et al. 2017; Lau et al. 2018; Pearcy et al. 2017; Rikkers et al. 2016; Subramaniam et al. 2016),
- increased impulsivity (Bargeron and Hormes 2017; Jeong et al. 2020a, 2020c; Kim et al. 2016, 2017; Rho et al. 2018),
- hyperactivity (Rikkers et al. 2016; Strittmatter et al. 2015),
- attention deficits (Andreassen et al. 2016; Müller et al. 2019),

- concentration problems (Kim et al. 2016),
- impaired life skills (Kuss 2017),
- low self-esteem (Lemmens et al. 2015; Scerri et al. 2019), and
- non-suicidal self-injury (Evren et al. 2020).

The literature base on the treatment of underlying psychopathology associated with problematic online gaming behaviors are consistent and corroborative given a single overarching theme—the impulsivity-compulsivity continuum (i.e., impulsive compulsive spectrum disorders (ICSDs); impulsivity-compulsivity spectrum, obsessive-compulsive spectrum, etc.). The core pathophysiological substrates related to the impulsivity-compulsivity continuum are impulsivity, hyperactivity, and attention deficits. The literature base reviewed in this study found clinical and subclinical presentations of attention-deficit hyperactivity disorder and obsessive-compulsive disorder, which is in alignment with the framework of the impulsivity-compulsivity continuum. The Online Gameplay Motivations Theory (Yee 2006) does not lend any perspective to this finding as Yee's theory focuses on players' motivations to play online games without any insight on how to treat problematic online gaming behaviors. The findings on underlying psychopathology or preexisting psychopathology associated with problematic online gaming behaviors are consistent with Davis's (2001) Cognitive-Behavioral Model of Pathological Internet Use given preexisting psychopathology is suspected to be a necessary distal cause of pathological Internet use. In other words, psychopathology needs to be present prior to all the other causes for the existence of specific pathological Internet use.

Furthermore, maladaptive cognitions associated with underlying psychopathology is the central factor described in Davis's (2001) model in which he asserts in the etiological chain this central factor is the manifested cognitional element which must be present. Therefore, it is inferred that the treatment of underlying psychopathology will extinguish problematic online gaming behaviors. Davis (2001), further, postulated that life stressors and exposure to technology primes individuals to cope with psychological distress by playing online games. In other words, when adults experiencing stress in managing circumstances and issues related to everyday life reach a level of psychological distress and have access to Internet technology are using online games to cope with their psychological distress with some adults developing problematic online gaming behaviors.

5 Conclusion

The current research findings and subsequential evaluation of the findings presented supported previous research study results encouraging further insight into problematic online gaming behaviors. In addition, the current research findings and evaluation of the findings contributed to the literature base on problematic online gaming behaviors experienced by adult MMORPG players. Two findings, increased attention and focus and increased technology competency, were surprises according to existing research, which indicated two benefits of excessive online gameplay. An additional finding, boredom with online gameplay, was a surprise according to existing research and found as a

potential means to prevent problematic online gaming behaviors in adult MMORPG players given direct lived experiences.

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Integrating Mental Health Services in Existing Healthcare System in Pakistan: A Public Mental Health Approach

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Abstract. This study intended to implement the Comprehensive Mental Health Services Plan (CMHSP); a cost-efficient, evidence-based, sustainable model of mental health services within the existing healthcare system in Khyber Pakhtunkhwa (KP) province of Pakistan. The CMHSP defined a package of mental health services based on the WHO Mental Health Action Plan (2013–2030) and Interagency Standing Committee (IASC) Guidelines. The study aimed to improve access to mental health services in a lower-middle-income country with limited resources. The study was informed by the Active Implementation Framework (AIF) to ensure replicability in similar contexts. The efficacy of the CMHSP is demonstrated through the constructs of the AIF model including a) exploration and adoption, b) program installation, c) initial implementation, and d) full implementation. The baseline and end-line data were collected through a mixed-method design. It was observed that following the implementation of the intervention for three years, the prevalence of Depression, Anxiety, Trauma, stress-related disorders, and somatic disorders were reduced by almost 25%. The at-risk groups identified in the community were children, adolescents, women, and first responders. And the protective factors were identified as help-seeking behavior, community support, religion, awareness of healthcare workers, and the availability of mental health services. This study is significant in answering the mental health challenges of Low- and Middle-Income Countries (LMICs), regarding the delivery of evidence-based mental health services in an integrated and culturally sensitive manner in a low-resource setting.

Keywords: Mental Health · Depression · Anxiety · Trauma · Pakistan · LMICs · Public Mental Health · Implementation Research · Mental Health Action Plan · Healthcare system · Evidence-based · Culturally sensitive

1 Introduction

The World Health Organization proposes that there can be 'no health without mental health' (WHO 2018). As mental health disorders contribute significantly to the international burden of disease (WHO 2005a). United Nations under the Sustainable Development Goals (SDG), has also included Mental Health in its under target 3.4 calling

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the countries to ensure, "by 2030, reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being". According to a WHO report, mental illness accounts for 4 out of 10 leading causes of disability worldwide, for Pakistan, an underdeveloped country, this figure goes up to 5 out of 10 leading causes of disability (WHO and UNHCR 2012). In Pakistan, there is a dire lack of statistics on mental health, but a rough estimate suggests that around 50 million people are suffering from mental illness (WHO 2017). Health expenditure in Pakistan stands at 0.9% of the Gross Domestic Product (GDP) (Pakistan Economic Survey, 2014–15), with no known provision for mental health. There is no policy framework to define a policy direction or guide resource allocation for mental health (Rathod et al. 2017). While Pakistan Mental Health Act was promulgated in 2001 its implementation suffers from a lack of resources needed (Tareen and Tareen 2016). There are no figures available for specified budgetary allocation for Mental Health and Psychosocial Support (MHPSS) Services. In Pakistan, mental health service availability is 0.0006 beds in a mental hospital and 0.422 beds in a psychiatric unit in general hospitals for a 100,000 population (WHO 2017). As for the human resource in mental health, there is only 1 psychiatrist available for a million people and 1 psychologist for 2 million people (WHO 2017). These are all serving at selected urban hospitals, making mental health services inaccessible to the larger population.

Within Pakistan, the province of Khyber Pakhtunkhwa (KP) has long been under the influence of natural and man-made disasters (Shah et al. 2020). These disasters significantly impact the collective sense of security and induced mental health issues in the population (Updegraff et al. 2008). After insurgency, during the years 2011–2013 mental health issues were rampantly reported but trauma responses peaked when the horrendous attack on Army Public School in Peshawar occurred in late 2014, causing the capital city to lose 150 plus children and teachers. This was the time when the Health Department KP realized the need for mental health services in the public sector. With financial support from Department for International Development (DFID) UK, a small project to provide Mental Health & Psychosocial Support (MHPSS) services to the affectees of the school attack was initiated by the Health Department KP. Later the project funded by UNICEF and the Health Department KP worked towards the development of a sustainable, evidence-based mental c as a pilot.

The Public Mental Health Approach

Public Health is 'the science of preventing disease, prolonging life, and promoting health through organized efforts and informed choices of society, organizations, communities, and individuals' (Winslow 1920). The Public Health approach to mental health entails that prevention and promotion are essential components of mental health services that must be included in the healthcare system to prevent disorders and promote well-being (WHO 2013). In Pakistan, the healthcare system is divided into three tiers: Primary, Secondary, and Tertiary (Kurji et al. 2016). To ensure health equity, mental health services must be available at all healthcare levels to ensure the optimal well-being of the population. The Health Department in collaboration with UNICEF developed a package of CMHSP and piloted it to provide evidence-based, sustainable mental health services at all healthcare tiers. The pilot was implemented for a period of three years and a baseline, and end-line assessments were used to measure the impact of the intervention.

2 Methodology

2.1 Rationale of the Study

To integrate mental health care into the existing healthcare system through the provision of standardized psychosocial interventions at all levels to improve access to care, reduce stigma, improve social integration, and enhance human resources for mental health.

2.2 Aims and Objectives

The aim of the study was 'to address the treatment gap in mental health services at all healthcare levels in district Peshawar of Khyber Pakhtunkhwa province'. Whereas the objective is 'to assess the efficacy of a locally contextualized model of mental health services 'Comprehensive Mental Health Services Plan (CMHSP) focusing on prevention and promotion of mental health'.

2.3 Frameworks Informing Implementation Approach

The study was based on the implementation research paradigm. Implementation research has been identified as a significant component of mental health services research as it attempts to provide solutions to a range of implementation problems (Brownson et al. 2012). It is broadly defined as, 'A scientific inquiry into questions concerning implementation-the act of carrying into effect, which in health research can be policies, programmes, or individual practices (collectively called interventions).' (Peters et al. 2013). It is conducted in the usual health service provision setting with an emphasis on health conditions, evidence-based interventions & programs, or healthcare settings with an aim to reduce the gap in treatment and quality of care (Proctor et al. 2012).

There is a huge treatment gap in mental health services in LMICs, this gap must be filled by taking evidence-based interventions to the general population through existing health systems (WHO 2017). This helps in the reduction of stigma as well as uses the existing resources thus the public would find it convenient to access these services. The current study combined the elements of implementation frameworks for the integration of mental health services in the existing healthcare services. The active implementation framework (AIF), and an evaluation framework implementation outcomes taxonomy (IO).

AIF is a process framework representing the overarching phases of this research (Fixsen et al. 2005) whereas the IO is an evaluation framework that differentiates between implementation and clinical/system outcomes (Proctor et al. 2011). The AIF frameworks guides towards the creation of conditions to facilitate the use of evidence-based practices that are replicable and robust for uptake in other similar conditions (DuMont et al. 2019).

The AIF provides the mechanisms and strategies to ensure that the translation of innovations into practice produces desired health outcomes. The formula of success that it presents, includes an evidence-based innovation/intervention, effective implementation, and enabling contexts (Blanchard et al. 2017). The AIF five core components are; a) an evidence-based intervention, b) implementation drivers, c) implementation stages, d)

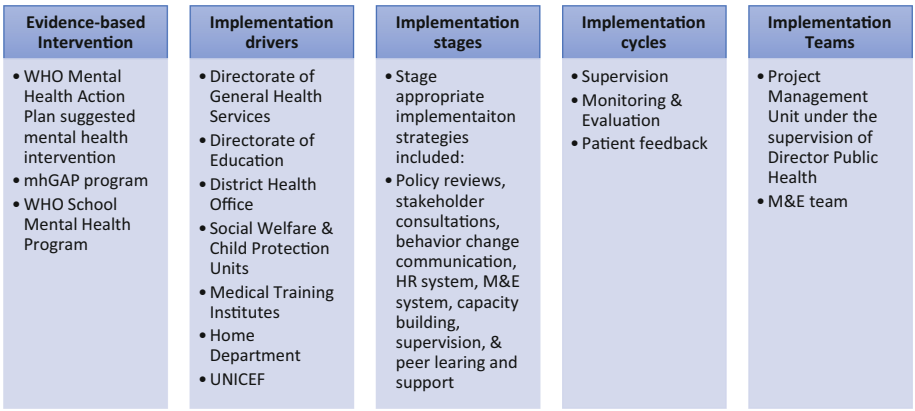

Fig. 1. The active implementation framework constructs

improvement cycles, and e) implementation teams. Figure 1 provides an overview of the AIFs as conceptualized for this implementation study.

The component of the implementation stages served as a guide for the implementation of the intervention. It comprises four stages that often overlap (Lock and La Via 2015). Figure 2 presents the implementation stages for this implementation study.

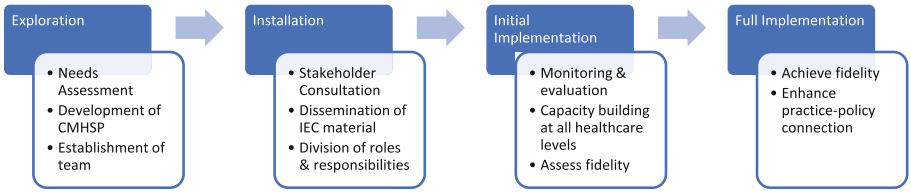

Fig. 2. Implementation stages adapted for the implementation of CMHSP

2.4 Research Design

An explanatory mixed methods design was employed for the implementation study. Data at baseline and end line was collected using qualitative and quantitative methods, this data was integrated at the interpretation phase to implement policy decisions. Data were collected at the following levels through the indicated toolkits:

a) **Individual and Community level –** three tools adapted to collect data from individuals in the community based on the WHO & UNHCR MHPSS (WHO and UNHCR 2012) needs assessment toolkit, the WHO AIMS (WHO 2005b), and the following tools.

   o **Tool 1 and 1a** for individual interviews at the community level for adults with questions adapted from the WHO toolkit, MSPSS-Multidimensional Scale of

Perceived Social Support (Zimet et al. 1988), the measure of connectedness (Betancourt et al. 2012).
- **Tool 1b** for individual interviews for children 12 – 18 years of age. The tool was adapted from SDQ – Strengths and Difficulties Questionnaire (Goodman et al. 2010), CHS – Child Hope Scale (Snyder et al. 1997), KIDCOPE (Spirito et al. 1988), MSPSS- Multidimensional Scale of Perceived Social Support (Zimet et al. 1988), and measure of connectedness (Betancourt et al. 2012).
- **Tool 2** for focus group discussions at the community level

b) **NGO level –** the non-governmental organizations working on psychosocial support were assessed on the:

- IASC MHPSS 4W's (Who is Where, When, doing What) mapping tool was distributed online among NGOs in KP to obtain an overview, with an expected outcome of enhancing coordination amongst different sectors.
- **Tool 3** covered the individual key informant interviews at the NGO level.

c) **Primary Health Care level –** data at this level was collected from healthcare providers and District Health Officers (DHOs).

- **Tool 4a** included open-ended questions for DHOs
- **Tool 4b** included closed-ended questions for primary health care providers based on WHO AIMS.

d) **Tertiary Health Care level –** this is the level with pre-existing mental health services. The following tools were used:

- **Tool 5** closed-ended questions for mental health professionals based on WHO AIMS
- **Tool 6** open-ended questions for mental health experts for FGD

2.5 Sampling

District Peshawar is divided into 4 towns for administrative purposes, to take a representative sample, two Union Councils were selected from each town (1 urban and 1 rural). The sample size was adjusted per each tool, using convenience sampling and data was collected by Community mobilizer Teams of the Social Welfare Department. The participants were recruited for the study from the community areas assigned to these teams. For children, data was collected from public sector schools in 4 towns (2 in each town) and the community (children out of schools) whereas, for adults, data was collected directly from the community. For children, consent to participate was sought from their parents prior to the collection of data, and for adults, verbal consent was sought at the time of data collection.

At the community level, 320 children from 4 towns completed the survey tool of which 161 participants self-identified as boys, and 159 as girls. The sample had a median age of 15.2 years (SD 2.0). 72.5% of the participants were enrolled in school which

included 201 girls and 119 boys. Amongst the sample, 29.5% of participants were working for daily wages. Furthermore, 83% of the participants lived with their parents, 15.1% with their relatives, and 1.9% lived alone.

For adults, 160 respondents (75 women & 85 men) with a median age of 34.5 years (SD 12.9) completed the survey. 50% of the respondents were married, 48.5% were unmarried, and 1.3% were widowed. A total of 15 FGDs and interviews were completed with 131 participants (61 women & 70 men) including; teachers, religious leaders, healers, social activists, Lady Health Workers, Medical Officers, Youth Counselors, Community Based Organization (CBO) representatives, Child Protection Representatives, and Jirga (community leader) heads.

Details are presented in Table 1.

Table 1. .

Service level	Tool	Sample size
Community level	Tool 1a	160 with a 10:10 male/female ratio
	Tool 1b	300
	Tool 2	4 FGDs with 6–10 participants each
NGO level	Tool 3	10 NGOs
Primary health care level	Tool 4a	1 interview
	Tool 4b	3 interviews
Tertiary health care level	Tool 5	4 interviews
	Tool 6	2 FGDs with 4 participants each

3 Implementation Strategy and Intervention

3.1 Exploration

3.1.1 Baseline

For the baseline, an assessment was completed for all four levels identified in the research design, and results were compiled for comparison and assessment with the endline, four years after the implementation of the intervention.

3.1.2 Comprehensive Mental Health Services Plan (CMHSP)

A comprehensive, integrated, and responsive mental health and psychosocial support service plan was developed to be tested at the community and system level in an all-inclusive and cost-effective manner. Since sustainability was the primary goal, the CMHSP focused on developing a non-specialized workforce for mental health to enhance the capacity of the Health Department. Utilizing the WHO mental health service organization pyramid the plan was designed. CMHSP suggests mental health services at all

healthcare levels embed a stepped care approach in the system as a paradigm in the provision of person-centered care targeting the needs of the individual rather than offering a one-size-fits-all approach to care. Individuals will be more likely to receive a service that more optimally matches their needs and contexts. The stepped care approach framework ensures (Government of Australia, 2013) (Fig. 3):

- Improving the targeting of low intensity psychological services.
- Cross sectorial early intervention for children and youth.
- Addresses service gap.
- Management of severe and complex mental health needs in a primary care setting through expert advice.

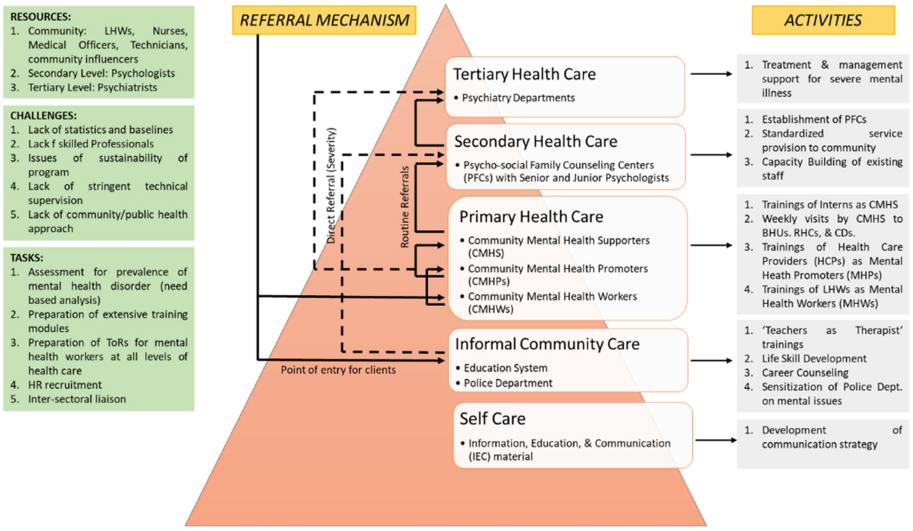

Fig. 3. Comprehensive mental health action plan (CMHSP). Copyright health department KP & UNICEF Pakistan.

The CMHSP is composed of self-care, informal community care, and system-based care (for which a proposed set of interventions were curated, Table 2), as explained with brief descriptions below:

a) ***Self-Care:***

Self-care is a concept representing a range of health-related decisions and care undertaken by individuals on their own behalf (Dean 1995). It is a deliberate action that individuals, family members, and the community should engage in to maintain good health. Considering the high burden of non-communicable diseases (NCDs) on the public health system there is a strong need to refocus on health promotion, disease prevention, and self-care amongst the public.

The promotion of self-care is an educational and empowering process that ensures that individuals with the right information can make the right decision as

far as their own health is concerned. Hence, promoting self-care amongst the public was a key component for which a communication strategy was developed for the promotion of the CMHSP.

b) ***Informal Community Care:***
Informal Community care includes mental health services without input from specific health professionals. It comprises services provided in the community that are not part of the formal health and welfare system and may include a range of approaches through traditional healers, teachers, police, village health workers, non-governmental organizations, and laypeople, for example. The CMHSP prioritized schools for targeted interventions at the community level and engaged the Department of Education for institutionalized coordination and sustainability of interventions and their effects. Hence, the 'Teachers as Therapists' intervention was developed, with the aim of equipping teachers with relevant and appropriate knowledge and skills as counselors to facilitate and promote early screening of mental health problems in students. Through tailor-made training and supervision programs, the teachers would be enabled to manage minor mental health problems of students themselves and make referrals to the public health care service as and when required. The project enhanced the capacity of 3,785 teachers from 155 middle, 140 high, and 30 higher secondary schools in district Peshawar. The ultimate beneficiaries of the program were around 102,488 students in the district. The project also supported and mobilized the participating schools to integrate mental health education, self-awareness, and life skills through a range of co-curricular activities at the school level and celebrating relevant national and international events and days like World Mental Health Day.

c) ***Primary Health Care (PHC):***
Primary healthcare service works at the community/field level to provide preventive, and promotive healthcare services to the community closer to their homes based on the whole-of-society approach (WHO and UNICEF 2018). Many LMICs, including in Pakistan, have limited access to healthcare services in remote rural areas, particularly for disadvantaged and vulnerable populations (Mailu et al. 2020). Over the years, the Government of Pakistan has launched several community-level interventions to bridge this service gap. Lady Health Workers (LHWs) Programme, launched in 1994, is one such initiative. The aim of this programme was to strengthen health systems at the household and community level and link them to hospital-based services (Glenton et al. 2013). The programme has enrolled more than 110,000 LHWs across the country, they are trained and deployed to carry out monthly visits to assigned households in the community to advise on health promotion, screening, basic management, and referral of health concerns (Schaaf et al. 2020). LHWs are recruited from within the community thus they can provide culturally appropriate services to their community.

For the implementation of CMHSP, collaboration was established with the National Programme for LHWs in KP for engaging the Lady Health Workers (LHWs) for interventions at PHC level. The project enhanced the capacity of 1,155 LHWs, serving in district Peshawar, on targeted modules on 'specialized mental health screening with the provision of basic level interventions'. The modules were

adapted from WHO's mhGAP intervention guide and translated into Urdu (local language) for the LHWs.

Medical Health Professionals (MHPs) including 200 Medical Officers/Technicians, already working at 48 Basic Health Units (BHU), 35 Civil Dispensaries (CDs), and 5 Rural Health Centers (RHCs), were trained on WHO's mhGAP intervention, for screening as well as provision of MHPSS services to provide the mild intensity interventions.

d) ***Secondary Health Care***

At the Secondary Health Care Level, tier two of the health service system comprising category B, C, & D hospitals, the CMHSP established and maintained 10 Psychosocial Family Counseling Centers (PFCs). PFCs, within the secondary health care system, aimed at providing extensive psychological interventions, with a focus on the curative aspects of the mental health service. The PFCs were connected with respective healthcare centers at the primary healthcare level through a designed and functional reciprocal referral mechanism.

e) **Tertiary Health Care**

At the Tertiary Care level, Psychiatry Departments of Medical Teaching Hospitals provided specialized pharmacological mental health services. The facilities related to PFCs at the secondary health care level and the primary health care level through an institutionalized referral system that worked along both the vertical and horizontal lines of the system to facilitate referrals with an inbuilt efficiency mechanism, facilitating the provisions of needed services to the public in the most cost-effective manner possible.

Table 2. Proposed interventions at different healthcare levels

Psychological interventions/Treatments			
S#	Basic level interventions (Community - LHWs)	Mild Intensity interventions (primary health care)	Extensive interventions (Secondary health care)
1	Empathic listening	Anger management	Behavior therapy
2	Psychoeducation	Counseling	DBT
3	Relaxation training	Group therapy	CBT
4	Stress management		TFCBT
5			EMDR

3.1.3 Establishment of Team

A Project Management Unit (PMU) was established at the Directorate General Health Services Khyber Pakhtunkhwa, which was Supervised by the Director of Public Health, headed by the Deputy Director of Public Health, and staffed with a Technical Lead,

Training Officer, M&E Officer, Information Management Officer, Finance Officer, and a Team Assistant.

The PMU was technically supported by UNICEF as well and monthly review meetings were held between the team to review and revise implementation strategies.

3.2 Installation

3.2.1 Stakeholder Consultation

A Multi-sectoral stakeholder consultation was held to receive ownership from all stakeholders in health (provincial and district level), education, social welfare, child protection, UN, and local organizations. The CMHSP bases its success on intersectoral collaboration for referral of people with mental health conditions identified at different service tiers. The consultation was chaired by the Director General Health Services and also endorsed by the Provincial Mental Health Authority.

3.2.2 Financial Resources

The United Nations Children Fund (UNICEF) committed to supporting the operational and human resource costs of the project throughout implementation and assessment.

3.2.3 Dissemination of Information Education and Communication (IEC) Material

Simultaneously, extensive IEC material was disseminated in the community via different information channels, social media, print media, public posters and banners, and radio programs to initiate dialogue on the significance and need for mental health care. The IEC material was adapted from WHO and UNICEF's work in similar contexts.

3.2.4 Division of Roles and Responsibilities

All sectors involved in the implementation (health, education, social welfare) were given roles and responsibilities and PMU initiated close coordination with all stakeholders to ensure that timelines were met efficiently. An intersectoral core Project Implementation Committee was notified by the Directorate General Health Services that included all stakeholders (Health, Education, Social Welfare, Child Protection, UNICEF) to periodically review the project implementation and arrive at informed decision making.

3.2.5 Capacity Building at All Healthcare Levels

For the initial implementation training sessions were initiated at all service levels and it took 18 months to complete training of all service tiers, considering the workload and other engagements of service providers at different levels. The training sessions were conducted by Master trainers in health and education, trained by the technical officer from the PMU. After training, each batch was assigned a supervisor and monthly supervision was initiated for all batches. Simultaneously the project hired 24 clinical psychologists to provide services at the secondary care level.

3.2.6 Information Management System

An Information Management System was developed for the CMHSP to consolidate real-time data from all service tiers. The data was collated and translated into daily, weekly, and monthly reports for uptake by the project donors and implementors. It also generated authentic data on regional statistical trends in mental health.

3.3 Initial Implementation

3.3.1 Provision of Mental Health Services at All Levels of Community and Healthcare

After the initial 18 months of the installation phase, service provision at all levels was initiated. The Self-care and community level services installed the sensitivity to take responsibility for personal mental health in the community, which led to an increased help-seeking behavior. Referrals were generated at different healthcare levels to other tiers and people displayed comfort in initiating dialogue on mental health. The trained healthcare providers helped other professionals within their own healthcare facilities to understand their mental health needs. Thus keeping the momentum of mental health services alive at the community as well as administration level.

3.3.2 Use of Data for Continuous Improvement

The PMU developed an MHPSS Monitoring and Evaluation Framework, closely aligned to the Information Management System, with identified indicators and methods of monitoring. A team was notified by the Directorate General Health Services including government officials, members from UNICEF and PMU to perform weekly, monthly, bi-annual, and annual monitoring exercises. Whereas for the evaluation of services all service providers were provided monthly supervision along with periodic patient feedback consolidation exercises. The outcome indicators were regularly revisited by the core team and changes were made as required.

3.3.3 Assess Fidelity

Fidelity is defined as the extent to which the implementation of an intervention adheres to the originally developed model (Mowbray et al. 2003). To assess the fidelity of the intervention, the service quality and standard were closely monitored via regular supervision sessions. These sessions were held for the LHWs, Medical Officers, teachers, and Psychologists. Within these sessions, the cases managed by them were examined and good bad practices where bad practices were identified to help the service providers improve treatment outcomes. Simultaneously, sessions were held with the health facility and educational institutes management to inquire about the larger outcome of the intervention and its impact on the services of the institution as a whole. To further the assessment of fidelity, service seekers were randomly accessed to get feedback on the services. Towards the end of the four years of the implementation of the project, an independent team of experts was commissioned to evaluate the implementation of the intervention. And the panel reported high fidelity in the service provision in the health

and education sectors. It was highlighted that referrals in mental health could still be improved through better compliance.

3.4 Full Implementation

3.4.1 Improved Outcomes

The endline conducted four years after the implementation of the intervention informed on improved outcomes for mental health service provision in pilot district these outcomes translated as reduced prevalence of mental illnesses, increased help-seeking behavior in mental health, enhanced awareness of healthcare professionals on mental health needs of the community, and the availability of contextualized resources for mental health.

3.4.2 Enhance Practice-Policy Connection

The outcomes of this intervention were used to inform policy for the province. Based on the health outcomes, the Government of Khyber Pakhtunkhwa sanctioned budget for this intervention to be integrated into the regular services of the Health Department. It also informed the finalization and implementation of the Khyber Pakhtunkhwa MHPSS Strategy.

4 Results

The intervention was implemented in the provincial capital city of Peshawar for four years to access the viability and effectiveness of CMHSP. A baseline and end line provided the requisite evidence to establish the effectiveness of the intervention through a mixed-method approach.

4.1 Quantitative Data

4.1.1 Community Level Data

Data to measure the distress level was calculated using the Strengths and Difficulties Questionnaire, it indicates the level of clinically significant mental health issues (emotional and social) in a person and the tendency of a person to develop these issues in near future. As per the data collected during the baseline, 31.5% of children between the ages of 12–18 years were found to have clinically significant mental health issues. Whereas 11.2% of children were reported to be at a risk for developing clinically significant mental health issues. It was further observed that girls reported internalizing their problems (i.e., negative behaviors that are focused inward such as sadness, fearfulness, social withdrawal, somatic complaints, etc.) while boys reported externalizing their problems (i.e., negative behaviors focused outwards such as hyperactivity, bullying, vandalism, conduct issues, etc.). In the endline, around 25.8% of children between the ages of 12–18 years were found to have clinically significant mental health issues. While 9% of children were reported to be at risk for developing clinically significant mental health issues.

In adults, women reported a higher level of distress (35.9%) as compared to men (29.7%). Women reported feeling helpless and not in control of their lives which is reflected in their persistent ill-health. Whereas men reported externalizing their problems by expressing anger and struggling to meet the demands of everyday life. In the endline, the distress level of women was reported at 21.2% as compared to men at 25%.

4.1.2 Healthcare Data

The data at baseline reported that at PHC and secondary health care level no designated services for mental health were being offered. Only 5% of healthcare providers at this level reported confidence in identifying mental health issues in a patient. Whereas the endline data revealed that around 80% of healthcare providers at PHC reported confidence in identifying and referring mental health issues.

The baseline revealed that no mental health services were offered at the secondary care level, whereas the endline revealed the presence of fully functional PFCs at all secondary care hospitals in district Peshawar.

The tertiary care level had designated Psychiatric Units with admission facilities available for patients with mental health conditions, endline revealed that their patient load was gradually sifting, and they were receiving referrals from PHC and secondary care level.

4.2 Qualitative Data

4.2.1 Community Level Data

Major sources of distress reported during community-based interviews are reported in Table 3.

Table 3. .

Theme	Sources of distress
Economic	Poverty
	Unemployment
Necessities	Lack of drinking water
	Shortage of medical and educational facilities
Safety & Security	Fear of terrorism and floods
	Safety and security issues
	Sexual abuse
	Violence in family and school
Social and interpersonal	Loss of relatives
	Problems at school
Gender-based	Lack of control in personal life decisions for women
	Upcoming marriage

The population identified religion, community support, help-seeking behavior, awareness of healthcare workers, and availability of health services as protective factors from mental health illnesses.

4.2.2 Healthcare Data

Some of the themes that emerged out of FGDs with healthcare providers and health management regarding the implementation of CMHSP in district Peshawar are:

Overall Feedback – participants reported overall positive feedback to the integration of CMHSP within the KP healthcare system. Healthcare providers highlighted receiving people with mental health issues at their healthcare facilities and feeling handicapped at helping them. But the training through this project gave them the confidence to manage the cases appropriately.

Capacity Building – the modules used during training were duly vetted by the health and education departments which were highly appreciated by management on both sides. The management informed of including these modules in regular service training to ensure that mental health services are prioritized with other healthcare services.

Supervision – the participants reported that supervision was one of the motivating factors for them as it 'opened channels' of learning for them. One of the participants shared that knowing that an intervention is going to get mainstreamed within the regular health service with the component of supervision is an 'excellent approach for young doctors to build their capacity'.

Ownership of the Department – the management as well as healthcare providers agreed that the ownership of the department at the provincial and district level adds to the significance of the intervention and boosts health outcomes.

5 Discussion

To the best of the authors' knowledge, this was the first time when such an extensive pilot was implemented in an LMIC at the district administration level using a standardized implementation and design framework. The study employed AIF and IO frameworks; our implementation approach consisted of a) Exploration, b) Installation, c) Initial Implementation, and d) Full Implementation, for integrating mental health services into the existing healthcare. During the pilot, careful consideration was placed on the stages of need assessment, development of the CMHSP, capacity building of staff at different service tiers, assessment of fidelity, and the enhancement of the practice-policy connection.

This study is significant in answering the mental health challenges of LMICs, regarding the delivery of evidence-based mental health services in an integrated and culturally sensitive manner in a low-resource setting. The design (CMHSP) can be easily replicated following the AIF framework in similar settings in a resource efficient, accessible, and acceptable manner while generating dialogue for mental health and reducing stigma in the community.

Mental health in Pakistan has long suffered due to intense stigma in the community and a lack of political interest. But with the recent global commitment to Sustainable

Development Goals, the Universal Health Coverage, and emerging challenges of mental health illness, the government has initiated work on mental health services at the policy level. At the national level, Pakistan has a National Mental Health Ordinance of 2001 (Tareen and Tareen 2016) while four major provinces of the country have their own Mental Health legislations. A review of these legislations reveals that they are grounded in a bio-medical approach to mental health. Furthermore, the legislations do not reflect the required shift in the delivery of mental health services from bio-medical to community-based services. It adapts the recovery approach in mental health services and focuses on the involvement of service users as partners in their own care and in the development of the services. This shift has been adapted by the Ministry of National Health Services Regulation and Coordination with the inclusion of mental health intervention in the Universal Health Coverage Benefit Package of Pakistan (GOP 2020) and the launch of the National Action Framework on Non-Communicable Diseases and Mental Health 2021–30 (GOP 2021). The framework has been endorsed by the National Inter-Ministerial Committee, which indicates the commitment of Provinces to implement the framework in their provinces.

The current implementation study aligns closely with the goals and objectives of the National Framework on NCDs and Mental Health as it provides a sustainable and cost-efficient model of integrating mental health services at the PHC level. Integrating mental health at PHC has been shown to improve the outcomes for persons with mental health illnesses by enhancing treatment uptake and ensuring accessible, available, and acceptable services (Mwape et al. 2010). The results reveal the effectiveness of this intervention in district Peshawar, which has a long running history of trauma triggers, so it has a chance to be efficacious throughout the country and in similar contexts elsewhere.

The results of baseline and endline reveal that integration would be beneficial not only in meeting our commitment to global targets but also improve the detection and management of mental health issues as people would be willing to access care that is available within their communities. Studies also reveal that one of the barriers to the uptake of mental health services is the fear and negative attitude of health care providers towards persons with mental health issues (Thornicroft et al. 2007). The implementation of CMHSP uses a three-pronged approach of sensitizing the policymakers, educating the care providers, and matching service to the needs of the community.

Considering the above background, the current study provides a significant and sustainable model to implement the existing mental health policies at all healthcare levels and the model is ideal for uptake by provincial governments while preparing action plans for the NCDs and Mental Health framework.

The recommendations of this study align with WHO's mental health action plan, which suggests that healthcare providers should be able to identify and attend to every service seeker's mental health needs. This skill of healthcare workers can help demystify mental health by encouraging people for seeking help, thus reducing the prevalence of mental health illnesses. The implementation model of CMHSP provides a holistic and person-centered approach to care that can be highly useful in not only the implementation of policies but also in de-stigmatize mental health for the community.

This project generated a range of communication materials that may be utilized and further structured for reaching out to the community. The project also sensitized

stakeholders from the community up to the policy level to increase the demand for mental health services. It presents an elaborate country-specific mental healthcare package that can be adapted by other countries for integrating mental health into the existing healthcare system.

This research has some limitations in monitoring and evaluation and representation of the sample to the entire country but adjusting for that the model is an appropriate fit for this region. The project is continued, and it requires careful monitoring to keep it on track and to target mental health issues in the community.

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Psychological Effects of Facial Exercises

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Abstract. Recently, it has been clarified that smiling has a positive effect on both physical and mental health. However, few studies have taught participants how to smile specifically and verified the effects of smiling. This study involved 13 undergraduates and graduate students at A-University practicing the Unpani Exercise in their daily lives for two weeks to clarify the psychological effects of smiling. Before and after the experiment, participants answered the Japanese version of Rosenberg's Self-esteem Scale, the psychological stress reaction scale, the Japanese version of the Ten Item Personality Inventory, and the mental toughness evaluation scale. To clarify the changes of facial expression by continuing the facial exercises, the participants' facial expressions were analyzed using the facial expression analysis software FaceReader8 (Noldus Co. Ltd). Participants were instructed to take a picture of their smile before the experiment, on the seventh day of the experiment, and after the experiment. The values of "Happy" calculated from their facial expressions were obtained by analyzing the pictures with FaceReader. The scores in sociality, a factor of the mental toughness scale, increased significantly after the experiment. In addition, the scores of will power and positive degrees showed a marginally significant increase after the experiment. For the other three scales, there was no significant increase in scores. According to the analysis with FaceReader, 8 out of 13 participants showed an increase in their values of "Happy" after the experiment, suggesting that the facial exercise improved their smiles. Therefore, the results suggest that facial exercises are effective in encouraging mental toughness and improving smiling. Based on these findings, facial exercises can be applied to prevent facial muscle weakness caused by masks and activate the brain through facial muscle activity, and they may also be used as a method of mental support.

Keywords: Facial exercise · FaceReader · Mental toughness

1 Introduction

Due to the influence of COVID-19 in 2020, most people are in an uneasy state of mind because they feel stressed by a limited lifestyle and do not know when these limitations will end [18]. These people might have feelings of uneasiness when they and their families are infected. In addition, people feel stressed because they smile less often

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based on decreased conversation due to stay-at-home requests and concerns about droplet infection [14]. As a way of dealing with this, the Japan Society of Stress Management proposes stretching and abdominal breathing, among other activities, to maintain the health of the mind and body, and recommends that people search for things to make them smile once a day [12]. Smiling, a behavior seen in everyday life, has recently been paid greater attention; it has been shown to have a great effect on the mind and body.

A previous study reported a stress-relieving effect of conscious laughter, autonomic laughter, and forced mechanical laughter when researching the stress coping effect of smiling [34].

Hirosaki [8] reported that smiling increased activity that was lost during stress and reduced fatigue. Her study revealed that the more participants smiled, the more their α-waves increased.

A study by Thea Zander et al. [48] suggested that people who laugh more in their daily lives are less likely to exhibit stress symptoms, even when stressful events occur.

In this way, it was recently revealed that smiling effects both psychological and physical aspects, which suggested a relationship between smiling and health conditions [33]. Facial feedback hypothesis is a known theory to explain these effects [49].

According to this theory, facial expressions are not managed by emotions, but emotions are managed by facial expressions. For example, when one smiles, positive emotions are increased. In contrast, when one frowns, negative emotions are increased. Research that supports this hypothesis includes a study in which subjects were asked to read a comic book while biting onto a pen and smiling intentionally and were then asked to rate how interesting the book was. The results of the study suggested that smiling itself, even if intentional, might help to increase positive emotions [42]. Other studies have tested the facial feedback hypothesis and reported results similar to the study by Strack et al. [24, 53].

The results of these experiments suggested the possibility that smiling promotes positive emotions. It was also suggested that increasing positive emotions by smiling leads to improved performance. Mori [28] said that smiling was a good way to relax tension. Iiyama [17] also argued that when one smiles, their brain misunderstands, sending the message "I am enjoying this situation" and secreting dopamine.

Smiling leads to improvement of vocalization when singing. Movement economy (generally defined as the aerobic energy cost required to perform a submaximal task, providing information about an athlete's aerobic efficiency while exercising at submaximal velocities) during running was reported [20, 31]. Athletes aim at not only improving technique and physical fitness but also maintaining psychological responses, and they smile in the sporting world.

Members of high school baseball clubs and the Japanese women's national ice hockey team used smiling in training, and they showed improved performance [11, 13]; smiling had a favorable effect on psychological responses and increased health and performance. The researchers instructed participants to smile temporarily during the above experiments, but they did not instruct participants how to smile. The participants in the study by Strack et al. [42] also changed their facial expressions by holding a pen in their mouths, but they and the researchers did not instruct them to use their facial muscles.

There is a possibility that if researchers instruct participants only to smile, the participants may feel anxious and smile differently because they were not sure how to smile. In addition, it is necessary to examine influences of smiling not only in experimental conditions but also in daily life, as in the above examples from sports, to verify the psychological effects of the habit of smiling.

As for previous studies researching such questions, there is a report on the intervention of facial muscle stretching and smile-making training for Parkinson's disease patients [35, 51]. In this study, interventions such as facial muscle stretching and smile-making training were found to be effective in relaxation, mood enhancement, and reducing stress and depression. The results suggest that hospital visits are effective not only for improving treatment but also for psychosomatic treatment.

It has also been suggested that interventions for facial muscle stretching and smile-making training have mood-enhancing effects for the elderly [36]. This method may also be effective in promoting psychological and physiological stability in anxious and tense subjects.

Thus, the psychophysiological and physiological effects of smile training have been revealed, but these studies are relatively new and need to be continued in the future. In addition, the subjects of these studies include patients with conditions such as diabetes and Parkinson's disease, as well as the elderly, who are at risk for facial muscle weakness. Few studies have been conducted on young, healthy subjects, and there is a need to investigate the effects of smiling in young males and females.

Therefore, the purpose of this study was to clarify the psychological effects of the exercise by having undergraduate and graduate students continue smile facial exercises for two weeks. The hypothesis was that the two-week facial exercise would help the participants develop a habit of smiling and, through the action of positive emotions, to learn how to cope with stress.

The grounds for using students are the following: 1. To clarify whether the effects of facial exercises are similar to those of previous studies in undergraduate and graduate students, given the paucity of research reports; and 2. To investigate the effectiveness of facial exercises for smiling on the stress of undergraduate and graduate students. Students are expected to be anxious and stressed about their studies and research, and this may have a negative impact on their physical and mental health in response to the COVID-19 pandemic that has been prevalent since 2020.

According to Ehara [5], university students have reported feeling anxious about student life in general in response to the COVID-19 pandemic, and there is concern that the restricted life and the uncertainty of when the pandemic will end may have a negative psychological impact on university students. In addition, the mandatory mask wearing due to the pandemic of COVID-19 has raised concerns about early deterioration of facial muscles.

In a study in which 100 university students were photographed smiling, only one student was able to make a Duchenne smile, which is considered a genuine smile, suggesting that many young people may not be able to use their facial muscles well [43]. It is necessary for university and graduate students to learn the effectiveness of smiling from a young age and to practice preventive measures against the deterioration

of facial muscles. Based on the above, we examined the effectiveness of continuous facial exercises from the perspective of psychological effects.

2 Methods

2.1 Participants

Thirteen undergraduate/graduate students (6 males and 7 females) enrolled at University A participated in the study. The mean age and the age range were 25.77 years old (SD = 9.68) and 19–52 years old, respectively. The students were invited to participate in the experiment in class, and after discussing the nature and purpose of the study, they agreed to cooperate.

2.2 Experimental Period

This study took place in 2-week increments from December 1, 2020 to December 14, 2020; January 7, 2021 to January 20, 2021; and January 11, 2021 to January 24, 2021 at the convenience of participants as the implementation period of the facial exercise.

2.3 Experiment Process

Subjects were shown a video of facial exercises for smiling and were instructed to perform them twice a day, 10 times each, before breakfast and dinner. The participants were asked to take pictures of their smiles before, on the seventh day, and after the experiment to allow us to examine changes in their facial expressions. We also asked the participants to fill out a record form to grasp the status of the exercise.

2.3.1 Facial Exercises

In this study, we asked the subjects to perform the Unpani Exercise, a facial exercise devised by Sugahara in 2009. According to Sugahara, the exercise promotes the formation of the Duchenne smile, which is said to be genuine, and allows one to efficiently move and stretch the facial muscles [15]. The Duchenne smile, named after the 19th-century French psychologist Duchenne, is composed of the pulling of the edge of the lips by the zygomaticus major muscle and the elevation of the cheeks by the contraction of the orbicularis oculi muscle (Sugahara, 2017). On the other hand, a smile that cannot be called a Duchenne smile shows activity of the zygomaticus major muscle but no contraction around the orbicularis oculi muscle. The way to do the Unpani Exercise is to repeatedly form the following facial expressions: “U” with eyes wide open and mouth agape, “N” with mouth wide open and breath out, “Pa” with eyes and mouth closed and corners of mouth raised, and “Ni” with lower jaw raised and upper and lower teeth lightly biting together to form a smile. In the exercise, the participants performed the above Unpani Exercise 10 times in front of a mirror and smiled at the end of the exercise. In addition, the participants were asked to look at a photo of a woman’s smile that they had prepared beforehand to help them visualize how to smile.

2.3.2 Data Collection Method

To measure the psychological effects of the facial exercise, the subjects were asked to answer a questionnaire using the following psychological scale before and after the experiment. In addition, an interview survey was conducted individually after the completion of the experiment.

According to the facial expression feedback hypothesis [49], previous studies have suggested that facial exercises help promote positive emotions by properly moving facial muscles and stimulating the brain. Positive emotions have been reported to buffer negative emotions, and it is possible that facial exercises may increase mental toughness, which is strongly related to self-esteem and positive emotions [32, 40]. In particular, the mental toughness scale can be applied regardless of whether one is an ordinary person or an athlete [41] and is considered valid in this study. Since it has been suggested that there is a relationship between personality tendencies and the ability to form a smile, practicing facial exercises may improve each factor in the personality test [45]. Furthermore, previous studies have reported that smiling has a stress-relieving effect [8, 34, 48]. Therefore, the following scale was selected for this study.

1) The Japanese version of Rosenberg's Self-esteem Scale [38] measures self-esteem as a positive/negative attitude toward the self via 10 items on a four-point scale. The number of reversal items is five. The total points of all items are calculated as the mark for self-esteem. As an example, respondents were asked to answer "Yes," "Often," "Not often," or "No" to "I am satisfied with myself." The total score is 40 points, and the higher the score, the higher the self-esteem.

2) The Psychological Stress Reaction Scale [25] measures psychological stress reaction using four subscales on depressed mood, irritability, anxiety, and fatigue. Participants answer 12 items on a four-point scale to calculate the mark for each scale. As an example, respondents were asked to answer "I have no hope" from "often" to "never." Since each factor consists of three items, the total score for each factor is 12 points, and the higher the score, the higher the psychological stress.

3) The Japanese version of the Ten Item Personality Inventory [3] is a personality test measuring the five factors of the Big Five Theory (extraversion, agreeableness, conscientiousness, neuroticism, and openness) to calculate the marks for each scale by answering ten items, such as "You think you are active and outgoing" or "You think you are prone to complaining about others and causing conflicts" on a seven-point scale.

4) The Mental Toughness Scale [41] measures mental toughness as a characteristic enabling one to overcome adversities and difficulties, consisting of four subscales: commitment, confidence, control, and challenge. Participants answer 12 items, such as "You have a dream, and you are willing to go to any length to achieve it" and "Someone who understands what you are thinking and feeling" on a five-point scale to calculate the marks for each scale. Since each factor consists of three items, the total score for each factor is 12 points, and the higher the score, the higher the characteristics of the corresponding factor.

5) Interviews with the participants were conducted before and after their participation in the facial exercises to analyze the effect of the smiling practice. The interviews were conducted using the semi-structured interview method, and the guidelines were prepared in advance. Since face-to-face interviews were not possible due to COVID-19, the web

conferencing tool Zoom was used for the interviews. Participants were asked to recall their behavioral and psychological states before and after the experiment, and to describe their changes. Moreover, we planned to hear the merits, disadvantages, and points for improvement of the facial exercises from the participants to utilize this data for preparing future exercise programs.

After the experiment, each subject was interviewed individually about the psychological effects of engaging in the Unpani Exercise. After the survey, the subjects' utterances during the interviews were transcribed. At a later date, we analyzed the relationships between their utterances and change of each factor score of the above scales before and after the experiment. To ensure objectivity, the analysis was conducted by four experimenters.

2.4 Data Analysis Methods

2.4.1 Psychological Effective Analysis

Scores of the five psychological scales were analyzed using IBM SPSS statistics to compare the scores before and after the experiment. The Wilcoxon signed-rank test was performed for the comparisons.

2.4.2 Changes in Facial Analysis

Photographs of smiling faces were analyzed using the facial expression analysis software FaceReader 8 (Noldus Co. Ltd). This software can quantify seven emotions (happy, angry, sad, surprised, scared, disgusted, and contempt) by analyzing pictures and movies recording facial expressions [54]. Previous studies have reported the effectiveness of facial expression analysis using FaceReader for Parkinson's disease patients and healthy elderly [35, 36]. This study was focused on a value of "Happy" corresponding to the degree of smiling among values obtained from the facial expression analysis.

2.4.3 Analysis on Results of Interview

The subjects' opinions about the psychological effects of Unpani exercise obtained from the interview were summarized through analysis by the experimenters and utilized for supplementing discussion about the change of each factor score of the psychological scales before and after the experiment.

3 Results

3.1 Implementation Status of Training

Participants who completed daily facial exercises were Participants A, B, C, D, and K, a total of five participants. The participants who did the exercises daily but did not do them either before breakfast or before dinner on one of the days were Participants E, H, I, L, and J, a total of five participants. The participants who were not able to do the exercises were Participants F, G, and M, a total of three participants.

3.2 Psychological Effects of Facial Exercises

For the self-esteem scale, psychological stress response scale, and the Japanese language version of the Ten Item Personality Inventory, when Wilcoxon's signed rank test was used to compare scores from before and after the experiment, no significant difference was observed. The factors that showed significant differences in the mental toughness scale using Wilcoxon's signed rank test will be discussed. The mean score of the sociability factor was 13.0 ($SD = 2.08$) before the experiment and 14.0 ($SD = 1.29$) after the experiment, a significant difference ($p = .026 < .05$). Next, the willpower factor showed a significant trend, with a score of 10.5 ($SD = 2.82$) before the experiment and 11.5 ($SD = 2.18$) after the experiment ($p = .053 < .10$). Similarly, the positivity factor showed a significant trend ($p = .071 < .10$), with a score of 11.7 ($SD = 2.02$) before the experiment and 12.4 points ($SD = 2.02$) after the experiment.

3.3 Changes in Facial Expressions Due to Facial Exercises

Table 1 shows the values for "Happy" measured from photos of the smiles of each participant taken before the experiment, on the seventh day of the experiment, and after the experiment. The two participants whose "Happy" values increased consistently in the photos were Participants A and C. The participants for whom the value of "Happy" increased in the photo taken after the experiment compared to before the experiment were Participants B, D, E, F, H, and K, a total of six participants. It is thus clear from analysis using FaceReader that the value of "Happy" increased for the majority of the participants.

Table 1. Each participant's measurement values of "Happy"

Participant	Before experiment	On the seventh day of training	After experiment
A	93.3%	97.3%	99.5%
B	98.1%	97.6%	99.0%
C	89.9%	97.8%	98.4%
D	81.9%	69.4%	93.6%
E	97.2%	87.3%	98.9%
F	97.2%	96.6%	98.8%
G	81.8%	93.4%	64.8%
H	98.6%	97.8%	99.6%
I	99.0%	94.8%	98.4%
J	95.7%	71.2%	84.1%
K	63.8%	57.7%	76.9%
L	86.9%	88.9%	83.5%
M	97.3%	97.2%	94.7%

4 Discussion

4.1 Psychological Effects of Facial Exercises

In this study, participants were asked to continue Unpani Exercise, a kind of facial exercise, for two weeks, and the psychological effects were measured. As a result, it became clear that on the mental toughness scale, sociability increased significantly, and willpower and positivity had a tendency to increase. Therefore, a relation may be seen between routinely encouraging smile formation and increasing mental toughness, which signifies increasing mental strength.

The fact that participants began proactively making smiles through the facial exercises and increased awareness of others' expressions such as smiles may be given as reasons for the increase in sociability. Fridlund [1] describes intentionally creating facial expressions that do not directly reflect one's actual feelings as a way to construct relationships with others [1]. Smiles are given as a particularly representative example. They are used as a method for making a good impression and are a necessary tool for communicating smoothly. Additionally, since it is possible to leave a positive impression from social interaction [2], smiles are an effective tool for constructing relationships with others. As in previous work, it was suggested in this study that by forming the habit of making smiles, opportunities increased to consciously and naturally make them, and this may have led to smoother communication and giving more positive impressions. As examples, participants said in interviews that they had new feelings of wanting to smile around family, or that they formed a habit of greeting people they met during walks, and it may be expected that these happenings led to an increase in sociability. In addition, due to the effects of the COVID-19 pandemic, opportunities to communicate in person have decreased. Miyauchi et al. [26] note that smiles are less common in online meetings than in offline meetings, and it is possible that in online meetings, where changes in facial expressions, particularly smiles, tend to be less common, it is easier for mutually negative impressions to be made. On the other hand, since people see not only others' facial expressions, but also their own facial expressions while speaking in online meetings, they also have the characteristic of naturally increasing awareness of facial expressions. The participants in this study became aware of their own eyes, the corners of their mouths, etc., during online meetings. They started caring about whether they were smiling well, and may have been able to exercise behavior that enabled smoother communication even in non-face-to-face situations. According to a study by Sawada and Kusumi [39], being able to read an expression of joy in response to a smile is one of the factors that may enhance the interpersonal communication skills of college students. It is possible that the increased opportunity to focus on their own smiles has made them more aware of the smiles of others, leading to an improvement in their ability to read facial expressions. Of particular note is how the effectiveness of the Unpani Exercise was suggested even when the participants wore masks in their daily lives under the influence of COVID-19. Due to the pandemic, the mouth, which is one of the facial parts involved in smile recognition, has been hidden by the mask. Nonetheless the participants commented that they thought the eyes alone could convey facial expressions. In this study, the Unpani Exercise moves not only the corners of the mouth but also the eyes and is thought to be training for conveying facial expressions with the eyes. In addition, it may

have improved their ability to communicate with others by reading the facial expressions of others from their eyes. As described above, while interaction with others is limited in various ways during the pandemic, the practice of facial exercises may have promoted communication with others via smiling and may have led to an improvement in sociality.

Next, the relationship between the improvement in willpower and the change in uplifting feelings will be discussed. On the mental toughness scale, willpower is defined as "the ability to not give up until one has achieved his or her goals" [41]. In an interview survey, some of the participants realized the importance of continuing to be active, and some of them decided to take on new challenges through the experiment. The participants stated that putting on a smile through facial exercises brought about these experiences. The results of the interviews suggest that practicing facial exercises leads to an increase in willpower, as the positive change in mood caused by forming a smile promotes the achievement of goals.

Finally, this study examined the relationship between the increase in positivity and the change in uplifting feelings. Previous studies have shown that uplifting feelings are promoted as a psychological effect, with signs that these emotions may lead to cognitive expansion [19]. In addition, Tsujita et al. [9] have reported that an uplifting mood was reinforced via an intervention using a digital device for promoting smiles in daily life. Similarly, our study has suggested that facial exercises for promoting smiles may lead to a positive change in the subject's mood, as well as "peace of mind," "change in the mindset," and "improving ones' mood." In previous studies, facial exercise was reported to have the same effect on the participants' peace of mind [29]. This indicates that a relationship exists between one's psychological state and the continuation of facial exercises in daily life. It is possible that the number of smiles shown in daily life is related to the subjective sense of peace of mind. Also, the participants during the facial exercise reported that smiling in front of the mirror helped them feel more positive and motivated them to do their best. The participants who commented on these feelings were anxious before participating in the facial exercise. However, the habit of smiling might have been one of the triggers for them to change their minds, and the uneasy feelings and anxiety they felt before the exercise might have been resolved, resulting in the increase in their positivity. As for the "improvement of mood," it has been suggested that one's smile may induce others' positive mood [30, 37]. However, based on the results of this study, it is possible that the person who forms the smile may also have a positive mood. In the study by Taguchi et al. [47], it was reported that laughing reduced anxiety and enhanced a positive mood. Although the present study did not focus on the improvement of mood, the participants gave their opinions about mood in the interviews. They said that they were able to lead a peaceful life without feeling depressed during the experimental period when they practiced facial exercises. Therefore, it was suggested that smiling might improve mood. Some participants reported that they were able to start the day with a smile and felt good because they were instructed to do the facial exercise in the morning for the experiment. Such improvement in mood might be due to the fact that moving facial muscles activated their brain and promoted positive emotions. Yamamoto et al. [55] proposed that people's negative emotions may be suppressed by providing them with positive information before they feel negative emotions. The results of the present study also indicated that the positive change in feelings caused by smiling provided a

means to change one's mind from negative emotions. These results suggested that the habit of the facial exercises in daily life could have a positive effect on feelings and engagement in post-exercise activities.

The results showed that facial exercise was associated with mental toughness, but that it was less associated with self-esteem, stress relief, and personality traits. Factors that increase self-esteem include group coexistence [10] and accompanying experience (the experience that one's efforts have yielded results) [50]. In addition, goal setting is one of the efforts that affect personality tendencies, and it has been shown that striving toward goals set by oneself brings one closer to the ideal personality [1, 2]. In contrast, there was no instruction other than those related to facial exercises in the present study and the participants worked on the exercises individually. Therefore, it was difficult to obtain experiences such as goal setting, group coexistence, and accompanying experience, and it was possible that the above psychological effects were not achieved. As for stress reduction, there was no significant change in the participants' scores on the psychological stress response scale before and after the facial exercise. In this respect, the results are not consistent with previous studies showing stress reduction and relaxation effects of smiling ([8, 34]). As an effect of smiling in relation to stress, Fujiwara [7] reported that a spontaneous smile with pleasant emotions increased pleasant moods that were reduced by stress [22]. Since the facial exercise in the present study called for conscious smiling, this exercise was not accompanied by pleasant emotions and thus did not produce psychological effects. In addition, it was possible that the psychological effects of the facial exercise were less apparent in the present study, which focused on stress reduction effects in daily life, compared to the previous studies that focused on the effects in specific stress situations.

4.2 Changes in Facial Expressions

Before and after the facial exercise, eight participants increased their values of "Happy" as measured by FaceReader. This suggested that habitually exercising facial muscles in daily life might enhance the expression of smiles and promote positive emotions. In the previous studies, facial training for patients being treated for Parkinson's disease and the elderly was found to increase their values of "Happy." Sugahara et al. (2005) [46] showed the aspect of facial muscle activity that brings about an ideal smile in relation to the recognition rate of smiles, and stated that smiles with high recognition rates could be formed by training facial muscles according to this aspect. The Unpani Exercise adopted in this study is intended to promote such facial muscle activity. The increase of the participants' values of "Happy" showed the improvement of their skills of smile expression after two weeks of continuous exercise.

The other eight participants did not show remarkable improvement in their smile expression during the exercise, because their values of "Happy" were over 90% before the experiment. In addition, it was not confirmed whether the participants were able to move their muscles appropriately during the facial exercises. In future experiments, it is necessary to take into account individual differences in smile expression and to provide instructions on how to move facial muscles so that each participant can perform the exercise appropriately.

4.3 The Effectiveness of Facial Exercise

In interviews with the participants, many of them said that they enjoyed the facial exercise. It is thought that the enjoyment of the Unpani Exercise was one of the factors that enabled the participants to continue the exercise for two weeks in their busy daily lives. In the study by Eguchi et al. [4], which focused on the reasons and motivations for continuing the exercise, the importance of "enjoyment and elation" was suggested as a prominent characteristic observed in those who continued to exercise [41]. Facial exercise to make a smile might enhance positive emotions according to the "facial feedback hypothesis" [49], and might be an activity that generates enjoyment. These characteristics might be significant in terms of the continuity and habituation of the exercise. When it comes to their relationship with mental toughness, it can be said that the enjoyment of the facial exercise contributed to the improvement of the level of positivity, and by promoting the continuation of the exercise, it also led to the improvement of willpower.

In the interviews, participants A and C, who said that they enjoyed the facial exercise, showed higher values of "Happy" both on the seventh day of the facial exercise and after the experiment than before the experiment. Their recording forms showed that they performed the facial exercise every day. Because of that, proper practice of facial exercise is considered to lead to improvement in their facial expression. There were comments in the interviews about their willingness to continue the facial exercise and improvement of their mood, indicating that the facial exercise had remarkable effects on them.

In contrast, participant D stated in the interview that he did not feel any effect after two weeks of facial exercises. The other participants reported that even though they had negative feelings toward the exercise at first, they gradually enjoyed it as they continued. However, participant D made many negative comments about his own smile during the interview. While other participants mentioned that they would like to make use of smiling in their daily lives in the future, participant D stated that he would like to make good use not only of smiling but also other facial expressions—a perspective that was different from the other participants. The study by Usagawa et al. [52] suggested that when people with a weak belief toward the effects of a smile consciously make a smile, it may cause their resistance and uncomfortable feelings about smiling. As for participant D, his weak belief in the effects of smiling might have caused him to feel resistant to the facial exercise, which might have prevented him from achieving the expected effects. When subjects practice facial exercises, the researcher needs to consider the individual characteristics of each participant and provide appropriate interventions.

4.4 Overall Discussion

As a result of having the participants engage in facial exercises for two weeks, there was a significant difference in the sociability factor of the mental toughness scale, suggesting that the focus on smiling is related to the improvement of communication skills for building relationships with others. In addition, there was a significant trend in the willpower and positivity factors of the mental toughness scale, suggesting that the use of smiles is related to physical and mental control. In addition, the two-week facial exercise program also suggested improvements in smiling, suggesting that it is desirable to incorporate training for smiling into daily life. Facial exercises stimulate the brain by moving the

facial muscles and influencing psychological effects [17]. However, it did not exert the effect of conventional smiling on some of the subjects, suggesting that different attitudes toward smiling may change the effect of the action [52].

However, since the amount of data was small, with 13 experimental subjects, and it was difficult to clarify the difference in the influence of smiling, it would be desirable to increase the number of subjects in the future and again examine the difference in the psychological effect and influence of facial exercises.

5 Conclusion

The results of a two-week facial exercise program for university and graduate students showed that the participants increased their scores for social skills, will power, and the positivity of the mental toughness scale. The results suggested that smiling can lead to the acquisition of mental toughness, and that facial exercise is effective for self-control of psychological aspects in daily life. In addition, the results of FaceReader analysis of smiling photos showed that more than half of the participants improved their values of "Happy," which indicated improvement in their smiles.

In the interviews, the participants answered that they became more conscious of their facial expressions through the facial exercise. The cause of this result might be associated with the requirement of wearing masks due to the recent spread of the COVID-19. The participants said that they had been less conscious of their facial expressions because they were required to wear masks for most of the day. However, they were considered to be able to feel the movement of facial muscles after the facial exercise and naturally became more conscious of their facial expressions. Because it is believed that manipulation of facial expressions is related to activation of brain function, there is concern that a decrease in facial muscle activity may have a negative impact on psychological aspects as well as brain activation. In order to avoid such a situation, it is important to practice facial exercises in daily life. This study demonstrated the effectiveness of the facial exercise called the Unpani Exercise to promote a spontaneous smile. Recently, facial training has focused on not only smiles; the small face effect has also been introduced, suggesting that facial training in daily life has become more familiar. For example, Ito et al. [21] proposed a system that allows one to perform facial training by making a target facial expression on a computer. In addition, Marshall and Peck [23] focused on people with visual disabilities who have difficulty making facial expressions and examined the effectiveness of facial expression training using EMG feedback [23]. In this way, as the importance of facial expression has increased, many training programs and exercises have been proposed. Future research should verify the psychological effects of facial exercise focusing on smiling and the ease with which the exercise can be performed in daily life by comparing the Unpani Exercise with other exercises.

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Indonesian Primary School Teachers' Perceptions of Student Misbehavior

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Abstract. Studies show that most problem behaviors in the classroom, such as daydreaming, talking out of turn, hindering other students and idleness, are not severe. However, the high occurrence of these behaviors may make them irritating, time-wasting, and, over time, influencing teacher confidence and stress. Managing problem behaviors may be difficult at times. All the changes due to the pandemic make this even tougher. Since 2020, the Covid-19 pandemic situation has pushed over 25 million primary school students in Indonesia into virtual learning. The present study was conducted to identify the most common and disruptive student behaviors as perceived by primary school teachers in Indonesia, both in the classroom and online learning environments. Data were collected through open-ended questions in an online survey which was distributed through various online channels. 373 primary school teachers from 22 provinces in Indonesia responded to the survey. Data were classified into categories of classroom problem behaviors developed by Sun and Shek (2012). The findings revealed that a few common and disruptive student behaviors as perceived by teachers both in the classroom and online learning environments were having disruptive conversations, non-attentiveness/idleness, and playing. Failure in submitting assignments, disobeying online classroom rules, and passive engagement in class were also reported as common problem behaviors during online learning, while bothering classmates and wandering around the classroom were reported as common disruptive behavior in classroom learning in Indonesian primary schools. The findings are discussed in terms of implications for future research and teacher practice in Indonesia.

Keywords: Primary school · Teacher's perception · Student misbehavior · Indonesia

1 Introduction

Student behavior problems have been a constant issue for teachers around the world. Disobedience, aggression, verbal abuse, and unacceptable behavior have been reported as the reasons for school suspensions in England, United States and New Zealand (Collin

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2001). Meanwhile, daydreaming, talking out of turn, and playing with personal stuff were reported as the most frequent misbehaviors by Chinese teachers, while daydreaming, talking out of turn, and slowness were perceived as the most troublesome ones (Ding et al. 2008). In a study about student misbehavior in Greek secondary education, Koutrouba (2013) described some frequent in-class misbehaviors as laziness, speaking without permission, lack of concentration, bothering friends during lessons, late arrivals, making annoying noise, eating/drinking, and verbal bullying to peers.

Student misbehavior has been defined as unruly behaviors which may disrupt teaching and learning processes or disruptive behaviors that may violate rules and/or expectations of classroom behavior (Sun 2015; Yusoff and Mansorb 2016). Student problem behaviors may range from low-level nuisances to challenging behaviors (Yusoff and Mansorb 2016). In many cases, the pervasive student disruptive behaviors are minor, low-level disturbances (Yusoff and Mansorb 2016). Only 6% of children in general education classrooms display problem behaviors in the clinical range (Little et al. 2000). However, a prolonged occurrence of such minor problem behaviors may still negatively impact teacher time and resources, reduce opportunities to learn and increase teacher stress and burnout levels (Austin and Agar 2005; Carpenter and McKee-Higgins, 1996; Hastings and Bham 2003; Lohrmann and Bambara 2006). In this situation, a teacher may respond aggressively to the misbehaving students to control them psychologically (Montuoro and Mainhard 2017; Riley et al. 2012). Classroom behavior management difficulty is also one of the reasons teachers leave the profession (Clunies-Ross et al. 2008; Ingersoll 2002).

Over the years, studies have been conducted to explore the frequency and seriousness of misbehaviors according to teachers' perspectives (Crawshaw 2015). In the Indonesian context, a study by Hitipeuw (2012) at a school in Balikpapan, East Kalimantan, found that excessive talking and inattentiveness were the most frequent student misbehaviors in the classroom. Being disrespectful, annoying, inattentive, and aggressive, along with excessive talking were the most difficult behaviors to manage by Indonesian teachers. Another study by Widodo et al. (2016) classified student problem behavior into student disruptive behavior and serious delinquency. Examples of student disruptive behavior include inattentiveness, disobeying teachers, cheating, and aggressive behaviors, such as making physical and verbal threats to others, while those of serious delinquency include truancy and stealing (Widodo et al. 2016).

The current Covid-19 pandemic situation has pushed students all over the world into online learning. Effective classroom management is important to promote learning (Pas et al. 2015; Skiba et al. 2016). However, there have not many studies exploring Indonesian student misbehavior during online learning. The current study was conducted to identify the most common and disruptive student behaviors as perceived by primary school teachers in Indonesia, both in the classroom and online learning environments.

2 Method

2.1 Participants and Procedure

This descriptive study was a part of a larger study exploring the role of attribution, teacher efficacy, and demographic characteristics in Indonesian teachers' strategies in managing

student behavior. The target participants of this study were primary school teachers in Indonesia. This study was aimed to include participants from various provinces in Indonesia, to better represent the Indonesian teacher population. Ethics approval to conduct this study was obtained from the Health Research Ethics Committee, Faculty of Nursing, Universitas Airlangga, Indonesia, prior to data collection.

Data was collected using an online questionnaire written in the Indonesian language. A poster advertising about the study was distributed through various online channels, such as Facebook, Instagram, and WhatsApp. The first page of the online questionnaire on Google Form displayed a Participant Information Sheet followed by an Informed Consent. Teachers indicated their consent by responding 'Yes' or 'No' to the statement 'I have read the Participant Information Sheet and I declare willingness to be a participant in this study'. Choosing 'Yes' would bring participant to the questionnaire, while those answering 'No' would be forwarded to a thank you page. An incentive of IDR 50,000 mobile recharge (approximately USD 3.5) was offered to 150 randomly selected participants of the larger study.

There were 373 primary school teachers from 22 provinces in Indonesia responded to the survey. Three survey was discarded due to double-entry, and data from the remaining 370 surveys were analyzed and reported in this paper.

2.2 Material

Data was collected using an online questionnaire which includes a section about demographic information, and open-ended questions exploring teachers' perceptions of the most common and disruptive student behaviors, both in classroom learning and online learning environment. The section on demographic information gathered information about teacher's age, gender, education, type of school (regular/inclusive school), school status (state/private school), and province. The open-ended survey in this study requested teachers to write down at least 3 examples of disruptive student behavior during face-to-face learning in the classroom, followed by the questions 'Among the examples given above, which one do you encounter most?' and 'Among the examples given above, which behavior interferes with the teaching and learning process the most?' The same set of questions were also provided to explore disruptive student behavior when students learning from home during the pandemic, described as '*saat belajar dari rumah/pembelajaran jarak jauh saat pandemi*' in the Indonesian language.

2.3 Data Analysis

Data was analyzed by classifying participants' responses into categories of classroom problem behaviors developed by Sun and Shek (2012). This process was done by two members of the research team, followed by a review by the authors. Discrepancies were resolved by discussion. Sun and Shek (2012) developed 16 main categories of classroom misbehaviors, in which six of them were divided into subcategories. The categories include doing something in private (five subcategories), talking out of turn (three subcategories), verbal aggression (four subcategories), disrespecting teachers (two subcategories), non-attentiveness or daydreaming, out of seat (four subcategories), failure in submitting assignments, physical aggression (three subcategories), copying homework,

non-verbal communication, clowning, lateness to class, playing, eating or drinking, not preparing textbook, and passive engagement (Sun and Shek 2012). If participants wrote more than one answer to the questions about teachers' perceptions of the most common and disruptive student behaviors, the first answer will be categorized.

3 Results

3.1 Sample Characteristics

Teacher participants in this study came from 22 provinces in Indonesia, spreading from the Special Region of Aceh in the western part of Indonesia to West Papua in the eastern part of Indonesia. As shown in Table 1, the sample distribution was uneven between provinces. There were more participants from South Kalimantan (14.6%), Central Sulawesi (13.2%), and East Java (10%), compared to the other provinces. Most participants (59.5%) teach in state/public schools.

Table 1. Teacher participants' background based on province and school status

Province	State School	Private School	Total	Percentage (%)
Special Region of Aceh	4	6	10	2.7
North Sumatera	2	14	16	4.3
South Sumatera	14	13	27	7.3
Jambi	-	4	4	1.1
Lampung	2	-	2	0.5
Special Capital Region of Jakarta	11	14	25	6.8
Special Region of Yogyakarta	1	5	6	1.6
West Java	2	10	12	3.2
Central Java	2	5	7	1.9
East Java	19	18	37	10
South Kalimantan	52	2	54	14.6
Central Kalimantan	-	1	1	0.3
East Kalimantan	19	9	28	7.6
Bali	13	11	24	6.5
West Nusa Tenggara	7	-	7	1.9
East Nusa Tenggara	2	-	2	0.5
Gorontalo	6	2	8	2.2
South Sulawesi	11	4	15	4.1
Central Sulawesi	28	21	49	13.2
North Sulawesi	6	3	9	2.4
West Sulawesi	14	3	17	4.6
West Papua	5	5	10	2.7
Total	220	150	370	100

As described in Table 2, among the participants, 79.5% were female and 20.5% were male. Participants' age ranged from 20 to 59 years, with most of them (77.5%) were younger than 40 years old. The mean age of participants was 33.4 years old (SD = 8.4). Consequently, the majority of participants (57.3%) had less than 10 years of teaching experience. Participants' years of teaching experience in this study ranged from a few months to 38 years. Most participants (89.5%) held a Bachelor degree, and a few of them (6.5%) held a Master degree.

Table 2. Teacher participants' characteristics ($n = 370$)

Characteristics		*N*	Percentage (%)
Gender	Male	76	20.5
	Female	294	79.5
Age	Under 30	144	38.9
	30–39	143	38.6
	40–49	62	16.8
	Above 50	21	5.7
Education	High school	5	1.4
	Diploma	10	2.7
	Bachelor degree	331	89.5
	Master degree	24	6.5
Years of teaching experience	Under 10	212	57.3
	10–19	133	35.9
	20–29	18	4.9
	Above 30	7	1.9

3.2 Teachers' Perceptions of Student Problem Behaviors in Classroom Setting

Table 3 summarizes Indonesian teachers' perceptions regarding students' problem behaviors inside the classroom. Teachers' responses were classified into 16 categories of classroom problem behaviors developed by Sun and Shek (2012). Three new categories (i.e., bothering classmates, making noise (e.g., knocking tables), and showing lack of understanding) were introduced as the results of the current study. The category 'bothering classmates' referred to behaviors that annoy other students and behaviors that disturb classmates' learning, while 'making noise' was added to represent behaviors such as knocking tables or other behaviors to make noise inside the classroom. Three new subcategories (i.e., yelling, interrupting, and too active/too much movement) were also added according to Indonesian teachers' responses in this study.

As shown in Table 3, teachers in this study perceived 'talking out of turn,' 'bothering classmates,' 'out of seat,' and 'playing' as the most common and disruptive behaviors

Table 3. A summary of teachers' perceptions of student problem behaviors in classroom setting

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
1	Doing something in private	Dealing with personal stuff	3	3
		Doing homework	-	-
		Using electronic device	-	1
		Irrelevant reading	-	-
		Irrelevant drawing	-	-
		Subtotal	3	4
2	Talking out of turn	Calling out	1	1
		Making remarks	2	1
		Having disruptive conversation	135	118
		Yelling*	4	7
		Interrupting*	7	4
		Subtotal	149	131
3	Verbal aggression	Teasing classmates	12	3
		Attacking classmates	-	1
		Quarrelling with classmates	-	6
		Speaking foul language	2	-
		Subtotal	14	10
4	Disrespecting teachers	Disobedience/Refusing to carry out instructions	4	11
		Rudeness/Talking back, arguing with teacher	2	1
		Subtotal	6	12
5	Non-attentiveness/ Daydreaming/ Idleness Sleeping		31	14
6	Out of seat	Changing seats	2	-

(*continued*)

Table 3. (*continued*)

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
		Wandering around the classroom	22	23
		Catching	-	-
		Running away from the classroom/Going in out the classroom	8	5
		Too active/too much movement*	8	5
		Subtotal	40	33
7	Habitual failure in submitting assignments		4	2
8	Physical aggression	Striking classmates	-	6
		Pushing classmates	1	-
		Destroying things	-	-
		Subtotal	1	6
9	Copying homework		3	2
10	Non-verbal communication	Via body language, facial expressions, papers	-	-
11	Clowning		8	7
12	Playing		20	20
13	Lateness to class		-	2
14	Eating/drinking		2	-
15	Have not yet prepared textbook well		-	-
16	Passive engagement in class		2	3
17	Bothering classmates*	Annoying classmates	48	63
		Disturbing classmates during learning	19	22

(*continued*)

Table 3. (*continued*)

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
		Subtotal	67	85
18	Making noise (e.g., knocking tables) *		9	18
19	Showing lack of understanding*		-	3
20	None		3	3
21	Others		8	15
	Total responses		370	370

* Categories added based on the results of this study.

in the classroom. 'Having disruptive conversation' was deemed the most common and disruptive behavior in the Indonesian setting, followed by 'annoying classmates.' While 'teasing classmates' indicated verbal aggression, 'annoying classmates' in this study referred to doing things, such as taking a classmate's pencil or scribbling in a friend's book to annoy him/her. 'Wandering around the classroom' was another behavior deemed inappropriate and disruptive by Indonesian teachers. 'Non-attentiveness' was perceived as common misbehavior by 31 teachers, but only 14 teachers mentioned it as disruptive behavior. Among these behaviors, more than a third of the teachers reported 'having disruptive conversation' as the most common and disruptive behavior in the classroom.

3.3 Teachers' Perceptions of Student Problem Behaviors in Online Learning Setting

Teachers' responses regarding student problem behaviors in online learning settings were classified into 16 categories of classroom problem behaviors developed by Sun and Shek (2012). Table 4 summarizes Indonesian teachers' perceptions regarding students' problem behaviors in online learning settings. In addition to the three new categories and subcategories described in the previous section, a new category of 'misbehaviors during online learning' was added based on teachers' responses in this study. This category referred to the behaviors reflecting disobedience to online classroom rules (e.g., turning off the camera and unmuting microphone during online classes), and lack of independence during online learning.

As shown in Table 4, teachers in this study perceived 'habitual failure in submitting assignments' as the most common and disruptive behavior during online learning. Some teachers also noted that several students asked their parents to do their homework. Teachers also reported 'non-attentiveness,' 'talking out of turn,' 'misbehaviors during

Table 4. A summary of teachers' perceptions of student problem behaviors in online learning setting

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
1	Doing something in private	Dealing with personal stuff	3	5
		Doing homework	-	-
		Using electronic device	21	20
		Irrelevant reading	-	-
		Irrelevant drawing	-	-
		Subtotal	24	25
2	Talking out of turn	Calling out	2	2
		Making remarks	2	-
		Having disruptive conversation	23	25
		Yelling*	-	-
		Interrupting*	6	8
		Subtotal	33	35
3	Verbal aggression	Teasing classmates	-	-
		Attacking classmates	-	-
		Quarrelling with classmates	-	-
		Speaking foul language	-	1
		Subtotal	0	1
4	Disrespecting teachers	Disobedience/Refusing to carry out instructions	6	9
		Rudeness/Talking back, arguing with teacher	1	1
		Subtotal	7	10
5	Non-attentiveness/ Daydreaming/ Idleness Sleeping		37	37
6	Out of seat	Changing seats	-	-
		Wandering around the classroom	1	1

(*continued*)

Table 4. (*continued*)

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
		Catching	-	-
		Running away from the classroom/Going in out the classroom	8	16
		Too active/too much movement*	1	4
		Subtotal	10	58
7	Habitual failure in submitting assignments		100	58
8	Physical aggression	Striking classmates	-	-
		Pushing classmates	-	-
		Destroying things	-	-
		Subtotal	0	0
9	Copying homework		1	1
10	Non-verbal communication	Via body language, facial expressions, papers	-	-
11	Clowning		-	-
12	Playing		18	20
13	Lateness to class		10	8
14	Eating/drinking		1	4
15	Have not yet prepared textbook well		-	-
16	Passive engagement in class		29	18
17	Bothering classmates*	Annoying classmates	3	9
		Disturbing classmates during learning	1	3
		Subtotal	4	12
18	Making noise (e.g., knocking tables)*		2	5
19	Lack of understanding*		6	6

(*continued*)

Table 4. (*continued*)

	Category	Subcategory	Number of responses regarding the most common problem behavior	Number of responses regarding the most disruptive behavior
20	Misbehaviors during online learning*	Disobeying online classroom rules	30	30
		Lack of independence	-	5
		Subtotal	30	35
21	None		11	15
22	Others		47	59
	Total responses		370	370

* Categories added based on the results of this study.

online learning,' 'doing something in private,' and 'playing' as common and disruptive behaviors during online learning. In general, non-attentiveness and passive engagement in learning was perceived to be more common during online learning than on-site learning. 'Using electronic device' for purposes other than learning was also reported by the teachers. Some specific 'misbehaviors during online learning' included turning off the camera and/or microphone when being asked to turn it on, or otherwise unmuting the microphone during class.

Twenty responses in the 'others' category referred to technical problems during online learning, such as lack of adequate facility to support online learning (e.g., having no device), network limitations, and environmental distractions (e.g., background noise). These situations may create challenges for online learning. However, these responses reflected technical problems rather than student problem behavior, thus were not included in any categories. Some other responses in this category referred to lack of parental support, communication difficulties during online learning, and student boredom.

4 Discussion

This study was aimed to identify the most common and disruptive student behaviors as perceived by primary school teachers in Indonesia, both in the classroom and online learning environments. Teachers' responses were classified into the categories of classroom problem behaviors developed by Sun and Shek (2012). A number of new categories and subcategories were added based on Indonesian teachers' responses in this study. The findings revealed some student problem behaviors that were perceived to be the most common and disruptive by Indonesian teachers, during on-site and online learning.

Among all categories and subcategories of student problem behavior, having disruptive conversations, playing and non-attentiveness were reported by teachers, both in the

classroom and online learning. However, the numbers of teachers perceived 'having disruptive conversations' as the most common and disruptive student problem behavior in classroom learning were approximately five times higher than in an online learning setting. This may be influenced by the nature of online classes, in which there is a physical separation between a student and his/her teacher and peers (Li 2012). 'Having disruptive conversations' appears to be a highly common and disturbing student problem behavior across cultures (Sun and Shek 2012). This behavior often creates disruptions in the classroom and required teachers to spend time managing the situation (Sun and Shek 2012). This finding is consistent with that of previous studies in the Indonesian setting, which identified excessive talking and inattentiveness as common disruptive student behaviors (Hitipeuw 2012; Widodo et al. 2016).

In terms of classroom learning, out of seat and bothering classmates were other problem behaviors perceived as common and disruptive by Indonesian teachers. 'Bothering friends' have been found as one of the frequent in-class misbehaviors in Greek (Koutrouba 2013), while 'out of seat' is perceived as a disruptive student behavior in China (Sun and Shek 2012). Respect, obedience, and order are parts of Indonesian classrooms. Within Indonesian culture, teachers are considered as respected individuals, and students are expected to sit politely and quietly, and follow teachers' instructions (Liem, et al. 2012; Zulfikar 2013). Thus, 'out of seat' is generally perceived as disruptive student behavior. Sun and Shek (2012) explained that student problem behavior may not necessarily rule-breaking, but violating norms or expectations.

Specific to online learning setting, habitual failure in submitting assignments were perceived as the most common and disruptive student problem behavior by Indonesian teachers, followed by disobeying online classroom rules, passive engagement in class, using an electronic device for other purposes than learning, and playing. This finding seems to reflect the notion of internet slacking or students' passivity during online learning as a type of problematic student behavior in online classes as suggested by Li (2012). Li (2012) stated that online learning might work better with older students, as it requires students to be ready for self-directed learning. As in other developing countries, there is a possibility that Indonesian student misbehaviors during online learning may be influenced by other factors such as the learning environment at home (e.g., noise), or lack of access to the Internet, learning resources and required equipment (Barrot et al. 2021). Such factors may hinder the students' ability to submit tasks on time, concentrate and actively participate during online classes. Some teachers in this study also reported inadequate parental academic support and lack of communication as challenges during online learning.

This study described some unique findings regarding Indonesian teachers' perceptions of the most common and disruptive student problem behavior. This study was among the first to survey teachers from 22 out of 34 provinces in Indonesia, and report teachers' responses in the context of both classroom and online learning. Nevertheless, some limitations were involved. First, teacher participants' demographic was characterized by younger teachers, with a mean age of 33.4 years old (SD = 8.4). Accordingly, slightly more than 50% of the participants had less than 10 years of teaching experience. This may be influenced by the data collection method using an online survey. During the data collection process, some research assistants raised the issue that, in some provinces

in Indonesia, older teachers may not be familiar with online surveys. However, distributions of printed questionnaires were not possible due to the enforcement of restrictions on community activities in many areas in Indonesia during August and September 2021 to respond to the COVID-19 pandemic. Future research in the Indonesian setting may seek to supplement online surveys with printed questionnaires to reach more teacher participants from different age groups. This strategy may also enable researchers to gain more participants from more areas in Indonesia. Second, the findings may be influenced by a certain degree of bias of the teachers. Future studies might complement the data collection method with classroom observations.

Previous studies highlighted that the high occurrence of student problem behaviors may waste teachers' time and impact teacher confidence and stress. In line with the findings of this study, implications for increasing Indonesian teacher competence in implementing effective classroom management skills, both in the classroom and online learning environments, are suggested. As highlighted by the literature, effective classroom management is imperative to promote learning and prevent student misbehavior. Research exploring Indonesian teachers' strategies in managing student behavior and ways to develop teachers' knowledge and skills in classroom management is required, both in the classroom and online learning environments. Considering the findings of this study and the ongoing COVID-19 pandemic situation, Indonesian teachers and policy makers are also encouraged to design more effective learning programs to promote student engagement while they are learning from home.

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Empowering Millennials Working in Small and Medium Enterprises (SMEs)' Affective Wellbeing: Role of Volition, Justice and Meaning at Work

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Abstract. Working in SMEs can be especially stimulating and challenging to millennial employees who will soon be the biggest generation serving the workforce. This paper addresses the impact of work volition and organisational justice on the affective wellbeing of millennial employees. It seeks to better understand the role meaningful work has on millennials' affective wellbeing. Using a sample of 403 millennial employees working in SMEs, this paper employs a quantitative data analysis approach using SPSS PROCESS. The results suggest that work volition (in regards to sub dimensions of volition and structural constraints) significantly predicts better affective wellbeing among millennial workers. While organisational justice, in relation to interactional and distributive justice, positively predicted millennials' affective wellbeing. Meaningful work was found to mediate all paths in the relationships of work volition and organisational justice with affective wellbeing. Implications of this paper include promoting affective wellbeing of millennials by providing more transparency and opportunities to express as well as cultivating a good match between employee-employer promises, processes, and work expectations. This study also highlights the important role of promoting meaning at work to enable millennial workers to thrive in their careers.

Keywords: Work volition · Organisational justice · Meaning at work · Wellbeing · SME · Millennials

1 Introduction

Work volition and justice are two work aspects that can influence employees' affective wellbeing experience at work (Ndjaboué et al. 2012). Work volition concerns employees'

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will to seek freedom to express and make choices regarding their work (Duffy et al. 2012). Meanwhile, justice concerns the righteousness of cause that may include aspects such as procedure, selection, transparency inside or outside the work decision-making processes (Ndjaboué et al. 2012). Understanding volition and justice at work requires a comprehensive view of human motivation to strive or grow both as a respectful worker and an independent individual. Because of the inherent complexity of human needs in assessing employee relations, more research has shifted to explore the motivational and subjective aspects of work to better understand the consequences of less tangible working aspects and behaviours on employee health (Dik et al. 2020; Duffy et al. 2012).

The degree of employee experience related to work volition and justice can determine their state of wellbeing at work (Ndjaboué et al. 2012). Studies suggest that dealing with injustice increases the risk of impaired cardiovascular regulation due to stress arousal (Elovainio et al. 2006), burnout and reducing employees' organisational commitment (Kernan et al. 2016). Besides these adverse health implications, it also leads an organisation to face monetary, manpower or performance issues which can reduce organisational effectiveness in the long term (Soenen et al. 2018). However, concerns over work volition and justice to employee affective wellbeing are less emphasised especially the earlier variables are more commonly explored among a non-working or student population (Allan et al. 2020; Autin et al. 2017). Given the significance of work to individuals regardless of employment status (i.e. working or not), and the ongoing need for individuals to seek freedom, transparency, and choices in life, it sets the importance for this subject to be evaluated across different work and life stages.

This research focuses on the millennial generation working in SMEs. A survey conducted by American Express SME Pulse found that more than three-quarter of SMEs do not have a strategy in place to attract millennial talent into their organization (Webb 2019). This is even although, appealing to this target segment would significantly increase their revenue in the short term (Webb 2019). With the growth of SMEs in many parts of the world and an increasing millennial segment in the workforce, this research is essential in understanding affective wellbeing at work among millennials working in SMEs.

Accumulated studies on generational research have mentioned millennials as a unique cohort that thrives on their subjective or emotional states at work (Tan et al. 2019; Yap and Badri 2020). While millennials may share similarities with the previous cohorts of Boomers and Gen-Xers, they are outstanding in several ways due to their upbringing and economic values. First, millennials are said to be internally driven by values such as freedom of choice, flexibility, and transparency offered by organisations. As a generation that is part of a change agent for better integration of technology at work, millennials are naturally more technologically savvy and fluid in their ways of working. Besides, the tendency of job-hopping is evident among millennials that often find themselves unable to connect their internal values with work values or the culture of an organisation (Pandey 2019).

Managerial research has emphasised millennials as a highly talented group, but organisations require more knowledge on the underlying subjective process on how they perceive work to maximise their participation and performance (Gaidhani et al. 2019). Thriving based on emotion, this group of employees put more meaning towards work

(Yap and Badri 2020) and need to do what they love to sustain (Gaidhani et al. 2019). Earlier studies have been consistent on the role of meaning at work as a strategy to attract and retain millennials as a predictor (Tan et al. 2019; Siahaan and Gatari 2020; Yap and Badri 2020), or as a mediating variable (Supanti and Butcher 2019) in examining positive outcomes at work. Nonetheless, a lack of understanding is established on the role of meaning at work in the relationship between work volition and justice with affective wellbeing among millennials, which therefore leads to another focus in this paper.

Given the argument which points to millennials as a 'sentimental' cohort (Yap and Badri 2020) that thrives based on the current state of emotion and having a meaningful life, therefore, the paper's main objective is two-fold. The first is to examine how millennials' experience of work volition and justice predict their state of affective wellbeing. The second is to explore the mediating role or mechanism of meaning at work to explain the linkages between work volition, justice and affective wellbeing. Drawing upon the psychological contract theory (PCT), this paper resonates that millennials' state of affective wellbeing will be underlined by whether employee's expectations and subjective belief towards self, surrounding resources and organisation are adequately fulfilled similar to fundamental arguments of this theory (Kotter 1973) in which Guest (1998) argues as valuable within a multidisciplinary research.

In the year of 2000, Van Katwyk et al. (2000) have developed a measure of affect at work; named as job related affective wellbeing. The scale was developed to measure positive and negative emotional reactions to work. Their factor analysis found two distinct clusters of affective phrases which were found to represent either positive or negative affect. Since then, researchers like Hosie and Sevastos (2010) have argued that job-related affective wellbeing is the closest expressions of happiness in the workplace hence explaining why these two terms are interchangeably used among organisational researchers. Employees who display positive emotions are said to be expected to display these characteristics in a stable fashion over time (Hosie and Sevastos); which further proves the importance of examining affect at work.

Chaiprasit and Santidhiraku (2011) have reiterated the importance of ensuring happiness of employees (conceptualized as positive affect at work) in SMEs, especially considering SMEs limitation in regard to capital and technology. SMEs might have disadvantages such as a lack of resources and funding that is synonymous with larger organizations; which hence, could have a negative impact on the structural aspect of an organization; consequently; having an impact on employee happiness. Although SME's importance to the economy is undeniable, there has been a lack of research and attention on the human resource practices of SMEs (Heneman et al. 2000), and specifically, a lack of human resource practices that can improve affective wellbeing within the SMEs landscape. This inherent lack of information and research on SMEs is concerning and an issue for theory, research and practice. This is because as most management theories are developed and tested upon large organizations; less is understood on its applicability into smaller; medium sized firms (Heneman et al. 2000). Hence, this research plans to address this gap.

2 Literature Review

2.1 Work Volition, Justice and Affective Wellbeing

Work volition refers to the perceived autonomy of an individual to make work-related decisions despite constraints (Duffy et al. 2012). It concerns the opportunity to which an employee can determine their career choices which are aligned with their personal preferences with corresponding job characteristics (Duffy et al. 2012). In principle, the ability of an employee to choose or exercise control in making choices related to work or job is a critical indicator of work volition (Duffy et al. 2012). Blustein (2008) argued that work volition is one of the critical components of psychology at work where it relates to employee's fulfilment of self-determination. According to the self-determination theory (SDT), enabling positive work experiences requires the presence of three important elements which are autonomy (free will in the choice of work), competence (one's mastery in a role), and relatedness (feeling of connection with others) (Ryan and Deci 2000 as cited in Blustein 2008). The limited availability or minimal job choice (or described as low work volition condition) will lead an individual to have difficulty fulfilling the three needs outlined in the SDT (Duffy et al. 2013).

In addition, the Psychology of Working Theory (PWT) also suggests work volition as a core element contributing to employee wellbeing at work (Duffy et al. 2016). This has been supported by a compelling body of evidence that established linkages between work volition with higher general wellbeing (Blustein et al. 2002; Blustein 2013; Duffy and Dik 2009) and work-related wellbeing among the workers' population (Duffy et al. 2015). Although some studies discuss the role of work volition on the wellbeing of millennials, existing evidence has suggested greater demands to acquire more volition related to work by pursuing work-life balance (Twenge et al. 2010) more than the previous generation (Azis et al. 2018). A small body of literature also pointed to financial behaviour and independence as predictors of millennials' wellbeing in general (Lusradi 2019; Cwynar 2020). Millennials are said to exhibit an unhealthier pattern in spending behaviour than older generations (Lusradi 2019) which leads to bigger wellbeing concerns (Cwynar; 2020). Although these studies focus on the millennials' financial liberty in general, it points to the possibility of reduced wellbeing when facing financial constraints concerning work as shown in the study by Liu et al. (2019) which discovered limited financial independence as a problem for millennial entrepreneurs in advancing work. Besides, it is a well-known knowledge that millennials thrive less under despotic leadership (Singh et al. 2012; Yap and Badri 2020) and need less structural constraints and more transparency (Ferri-Reed 2014) to flourish at work. Therefore, based on these evidence, the first hypothesis of this paper is stated below.

Hypothesis 1a, b, c: Work Volition (volition, financial constraints and structural constraints) will positively predict millennials working in SMEs' affective wellbeing.

Organisational justice (e.g., distributive, formal, interactional) refers to the perception of fairness that an employee received at work (James 1993). Cropanzano et al. (2001) argued that employee experience of fairness at work is imperative since it leads to the fulfilment of psychological needs (i.e., meaning, sense of belonging, control and self-regards) that may increase employee satisfaction. There are three main components

of justice: *Distributive justice* refers to fairness related to the judgment, *procedural* concerns fairness related to process and its element, and *interactional* refers to fairness in interactions. According to Cropanzano et al. (2001), employee evaluation on whether they are treated fairly in the organisation is crucial not only because it determines their overall experience but also undermines their psychological reaction to which Lawson et al. (2009) later stressed its importance to promote better wellbeing at work. This is supported by several other studies that highlighted the importance of employee justice experience to improve their wellbeing (Cramer and Hunter 2019; Herr et al. 2018) albeit the mixed findings often found based on justice components (i.e. distributive, procedural and interactional) (Nadiri and Tanova 2010). Additionally, a study by Kim (2009) discovered that employees with greater perceived fairness had a higher likelihood to establish a communal relationship with their organisation that is expressed in terms of higher commitment, trust, and satisfaction (Kim 2009). Also, few studies about millennials have mentioned justice as one of the leading aspects to promote wellbeing, commitment and retention at work (He et al. 2019; Xu et al. 2021). Therefore, below are the next hypotheses for this paper.

Hypothesis 2a, b, c: Organisational justice (distributive, formal and interactional justice) will positively predict millennials working in SMEs' affective wellbeing.

2.2 The Mechanism of Meaning at Work

One of the emerging work aspects which is recurrently discussed within a millennial context is meaning at work. According to Hackman and Oldham (1976), acquiring positive meaning related to work is important for employee motivation. When employees perceive work as a meaningful resource (i.e., significant, challenging, and complete), more effort will be exerted in completing the tasks because it matters to them (Rosso et al. 2010). A study done by Yap and Badri (2020) has discovered meaningful work as one of six contributors to greater happiness among millennial workers. The propensity of this cohort to place more subjective values in work leads them to perform best under the matching alignment of personal and organisational aspects (Roloff 2021; Yap and Badri 2020). However, despite millennials' values and mind set being the current organisational interest related to work behaviour (Wood 2019), yet a dearth of knowledge remains to explain how acquiring meaningful work can improve the affective wellbeing of millennial workers especially studies that take into account their work volition and organisational justice experience.

Research has suggested that generational differences exist in how employees define meaningful work (Weeks and Schaffert 2017). Nonetheless, organisations have increasingly recognised the importance of cultivating meaningful work among employees to promote greater engagement and employee retention (Delloitte 2017) especially among millennial workers who prefer to establish more meaningful work experiences through better policies related to work-life balance (Ng et al. 2010). Allan et al. (2014) suggested that meaningful work is indirectly linked to work volition (Allan et al. 2014) and employee wellbeing in general (Van Wingerden and Van der Stoep 2017). Besides, Duffy et al. (2015) posits that employees' perception of meaning at work may buffer the relationship between volition and job satisfaction through a person-environment fit

assessment. Although the argument of Duffy et al. (2015) is developed from a job satisfaction perspective, it is well known that job satisfaction is a component of wellbeing at work (Faragher et al. 2013; Rothmann 2008). Therefore, these linkages provide a hint on the potential mechanism between work volition, meaningful work and affective well-being among millennials. As such, the following is our next hypothesis for this paper.

Hypothesis 3a, b, c: Meaning at work mediates the relationship between work volition (volition, financial constraints and structural constraints) with affective wellbeing of millennial SME employees.

Pérez-Rodríguez et al. (2019) found that negative emotions mediated the relationship between organisational justice and work stress. Depending on millennials experience of justice, they will likely develop different reactions and evaluations toward work. This is somehow supported by a separate study by Supanti and Butcher (2019) which found that meaningful work functions as a mechanism which foster helping behaviours among millennial employees. Although there is no direct empirical evidence which links organisational justice with millennials' affective wellbeing via meaningful work, it is worth noting that the mediating potential of meaning at work was suggested in earlier studies (Arnold et al. 2007; Pradhan and Pradhan 2016). Besides, a small body of literature suggested that meaningful work is a potential psychological tool to retain and improve millennials' health and performance (Tan et al. 2019; Yap and Badri 2020; Twenge 2010). Therefore, our last hypothesis is presented below. Figure 1 illustrates the overall framework.

Hypothesis 4a, b, c: Meaning at work mediates the relationship between organisational justice (distributive, formal and interactional justice) with affective wellbeing of millennial SME employees.

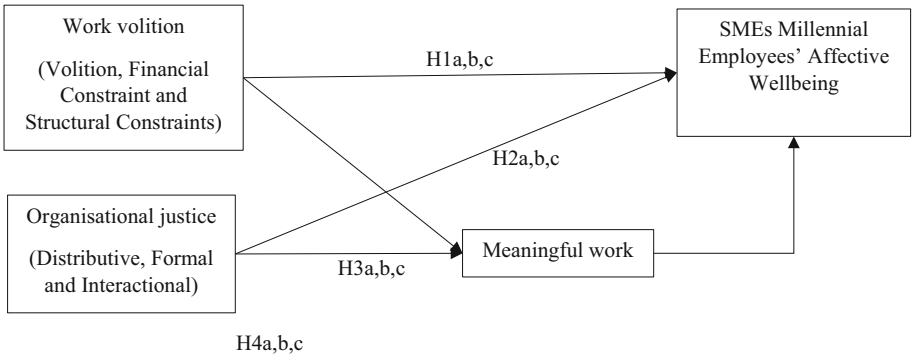

Fig. 1. Conceptual framework of this study

3 Methodology

3.1 Design and Methodology

This quantitative study uses the survey method. The sample consisted of 403 millennials employees that are currently working in small- and medium- sized enterprises (SMEs). All participants must fulfil these two criteria below to be qualified to partake in this study. Firstly, their age must be between 24 to 39 years old to fulfil millennial's criteria as those born between 1981 and 1996 (Pew Research Center 2019). Secondly, they must currently be working as an employee in any SME companies for a minimum of a 3-month period. SMEs are defined as a business company with total employees of less than 250 and a turnover which is less than 50 million euros (European Commission, n.d.). This paper focuses on SMEs due to its significant role to the community and economic survival by providing jobs and attracting new talents (Radas and Božić 2009). Besides, it concentrates on millennial employees in response to earlier research calls to develop greater understanding of generational values, attitudes and behaviour at work for this cohort (Raines 2002; Hershatter and Epstein 2010). All responses were gathered through the online survey platform, Prolific, using stratified random sampling. The data was analysed using the Statistical Package for the Social Sciences (SPSS) and the mediation analysis was further analysed using the SPSS PROCESS software extension.

3.2 Measures

Work Volition was measured with the Work Volition Scale by Duffy et al. (2012). The scale consists of 14 items with three subscales: volition (5 items), structural constraints (4 items,), and financial constraints (5 items) and were rated using a seven-point Likert scale. A sample of the item is "I have been able to choose the jobs I wanted", "I can do the kind of work I want, despite external barriers" and "I feel that outside forces have really limited my work and career options". Organisational justice was measured using the Organizational Justice scale by Moorman (1991). The scale consists of 20 items with three subscales: distributive justice (5 items), formal procedures (6 items), interactional justice (9 items) and were rated using a seven-point Likert scale. A sample of the items are "my work schedule is fair", "I feel that my job responsibilities are fair", and "my general manager explains very clearly any decision made about my job" Meaning at work was measured using the Work as Meaning Inventory by Steger et al. (2012). The scale consists of 10 items and were rated using a 7-point Likert scale. A sample of the item is "I have found a meaningful career", "I understand how my work contributes to my life's meaning" and "I have a good sense of what makes my job meaningful". Lastly, job related affective well-being was measured using the Job-Related Affective Well-Being Scale (JAWS) by Van Katwyk et al. (2000). The scale consists of 20 items and were rated using a 5-point Likert scale. A sample of the item is "my job made me feel angry", "my job made me feel inspired" and "my job made me feel excited". All scales had good reliability with Cronbach Alpha values above the cut-off threshold of 0.70.

4 Results

4.1 Correlation, Distribution, and Convergent and Discriminant Validity

Table 1 summarises descriptive statistics and correlations between variables of the study. All constructs for work volition, justice and affective wellbeing (AW) were found with moderate levels with mean scores above 4.60 after dividing the total mean into three categories of low, moderate and high. The skewness and kurtosis values ranged between ±2 and ±7. No sharp scores were observed which suggested a normally distributed dataset. Besides, intercorrelation suggest good discriminant and convergent validity with both work volition and justice exceeding the.70 cut-off for intra-constructs and less than .70 for inter-constructs.

Volition (r = .584), financial constraints (r = .552) and structural constraints (r = .581) showed significant positive correlation with AW. Similarly, distributive (r = .610), formal (r = .603) and interactional justice (r = .431) also have significant positive correlations with AW. Lastly, meaning at work is positively related with AW (r = .509).

Table 1. Descriptive and correlation between variables

Variables	Mean	Std	Skew	Kur	WV	VO	FS	SC	OJ	DJ	FJ	IJ	MW	AW
Work volition – WV	4.631	1.194	−.279	−.609	–	.787**	.934**	.959**	.444**	.452**	.308**	.362**	.491**	.630**
Volition – VO	4.680	1.286	−.524	−.316	.787**	–	.617**	.628**	.433**	.443**	.284**	.368**	.464**	.584**
Financial constraints - FS	4.708	1.420	−.310	−.749	.934**	.617**	–	.875**	.402**	.414**	.272**	.332**	.408**	.552**
Structural constraints - SC	4.473	1.606	−.150	−.913	.959**	.628**	.875**	–	.389**	.391**	.283**	.308**	.462**	.581**
Organisational Justice - OJ	5.145	1.187	−.965	.633	.444**	.433**	.402**	.389**	–	.778**	.869**	.865**	.541**	.610**
Distributive justice - DJ	5.063	1.271	−.791	.075	.452**	.443**	.414**	.391**	.778**	–	.475**	.498**	.570**	.603**
Formal justice -FJ	4.995	1.297	−.866	.490	.308**	.284**	.272**	.283**	.869**	.475**	–	.681**	.381**	.431**
Interactional justice – IJ	5.291	1.330	−1.142	.974	.362**	.368**	.332**	.308**	.865**	.498**	.681**	–	.416**	.509**
Meaningful work -MW	4.742	1.373	−.573	−.058	.491**	.464**	.408**	.462**	.541**	.570**	.381**	.416**	–	.694**
Affective wellbeing -AW	3.300	.688	−.418	−.180	.630**	.584**	.552**	.581**	.610**	.603**	.431**	.509**	.694**	–

Note: **p is significant < .005, ***p is significant < .001.

4.2 Hypothesis Testing

Direct effects between work volition, justice and AW and mediating effects of meaning at work.

Table 2. Direct and indirect mediation effects

Variables/Path	R^2	R	Direct effects (Affective wellbeing- AW)		R^2	R	Direct effects (Meaningful work)		Indirect effects	
			Beta estimates (sig)	Std error			Beta estimates (sig)	Std error	Estimates	95% BC Interval (LLCI, ULCI)
Direct effects	.643	.802			.424	.651				
Volition – VO			.163* (.000)	.022			.377* (.000)	.051	–	–
Financial constraints – FS			.013 (.753)	.020			.046 (.387)	.052	–	–
Structural constraints - SC			.143* (.001)	.019			.098* (.075)	.047	–	–
Distributive justice - DJ			.154* (.000)	.022			.147* (.005)	.056	–	–
Formal justice -FJ			.049 (.446)	.034			−.172* (.034)	.086	–	–
Interactional justice – IJ			.158* (.016)	.034			.330* (.000)	.084	–	–
Meaningful work - MW			.372* (.000)	.020			–	–		
Indirect effects mediation)										
VO → Meaningful work → AW			–	–			–	–	.158*	.119, .205
FS → Meaningful work → AW			–	–			–	–	.114*	.082, .147
SC → Meaningful work → AW			–	–			–	–	.104*	.075, .133
DJ → Meaningful work → AW			–	–			–	–	.135*	.103, .169
FJ → Meaningful work → AW			–	–			–	–	.122*	.087, .159
IJ → Meaningful work → AW			–	–			–	–	.129*	.095, .169

Note: * is marked for significant results.

Table 2 summarises direct and mediation effects of the variables in this study. Overall, all the six sub constructs of work volition (WV), work justice (OJ) and meaning at work contribute to 64.3% variance in AW. Detailed result for WV suggests two significant direct effects from volition (B = .163) and structural constraints (B = .143) sub constructs with AW. Similar results were found for OJ; distributive (B = .154) and interactional justice (B = .158) were positively associated with AW. Although there were small effects

observed for financial constraints and formal justice, these were insignificant. Based on these results, H1a, H1c, H2a and H2c were supported.

Moreover, this paper discovered significant results for all proposed mediation paths. Based on the direct effects, partial mediations were found for the mediation paths that occur between AW and volition (indirect effects: .158), structural constraints (indirect effects: .104), distributive justice (Indirect effects: .135), and interactional justice (Indirect effects: .129). On the other hand, full mediations were observed for the path between AW and financial constraints (indirect effects: .114), and formal justice (indirect effects: .122). Therefore, hypotheses 3a,3b,3c, 4a, 4b and 4c were supported (Fig. 2).

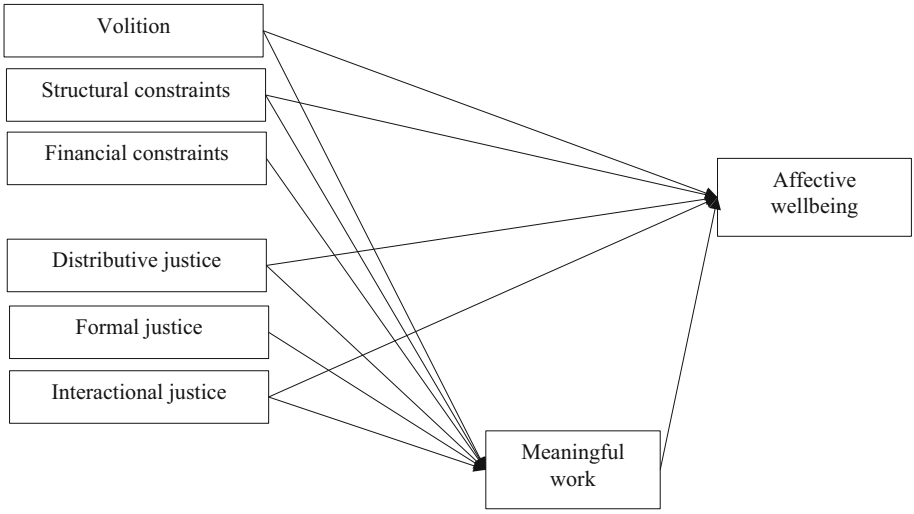

Fig. 2. Significant paths in the study

5 Discussion

Results from this study contributes to a greater understanding on the conceptual framework in relation to the associations between work volition, justice, meaning at work with working millennials in SMEs. It provides additional support to prior empirical research on the positive influence of work volition towards millennials' affective wellbeing. This finding illustrates the importance of providing opportunities for employees to engage in work-related decisions and acquiring power to choose the things they would pursue in the workplace (Duffy et al. 2012). When organisations offer employees such freedom, it gives them a healthy sense of work ownership. Based on the results, both volition and structural constraints impact the affective wellbeing of millennial employees. In other words, concerns regarding freedom of choice and the degree of flexibility and the impact of external factors (e.g., economic condition, job availability, personal constraints) need to be addressed; thus extending the existing finding of Duffy et al. (2012). Duffy et al. (2012) mentioned that although work can fulfil basic human needs (i.e., monetary and

life resource), it is often challenging to seek jobs where employees can fit in and fulfil their need for self-determination. Millennials flourish when provided more autonomy, creativity, and control (Twenge 2010; Yap and Badri 2021).

In addition, this paper extends the existing literature on the perceived effects of organisational justice to the affective wellbeing of millennial workers (Xu et al. 2021). Based on the findings, this paper discovered the significance of distributive and interactional justice in improving affective wellbeing at work. Interestingly, this result points to several key values among millennials at work, especially in SMEs. Most important to this cohort is how organisations make decisions. To be part of an organisation that justly handles their concerns, feedbacks and interactions related to justice-related processes is crucial for millennials to develop higher organisational trust and experience better affective wellbeing conditions. This is somehow supported by He et al. (2019)'s research which argues that promoting a trusting environment by providing more transparency in human resource management processes and responsible leadership are essential to establish a positive working environment for millennials. In addition, formal justice has less influence on their affective wellbeing. This finding resonates with the study of Pînzaru et al. (2016) wherein millennials were less inclined to seek formality at work as it can limit their efficiency and freedom to express their opinion when at work.

This paper has underscored the significance of meaning at work in relation to work volition, justice and affective wellbeing. It also strengthens the findings of previous research done on the importance of meaning at work for the millennial cohort (Supanti and Butcher 2019; Yap and Badri 2020; Tan et al. 2019) although there is a lack of scientific evidence established under these variables studied in this research, such as the mediating role of meaning at work. As such, it is crucial for millennials to find the meaning behind what they are doing in life (Pînzaru et al. 2016) and to experience a good fit between their values and those of their organisation (Yap and Badri 2020). In this respect, acquiring greater freedom in career and working in a just and transparent organisation will help this cohort to have a greater appreciation of their role and identity related to work which in turn improves their subjective wellbeing conditions.

5.1 Limitations

There are few limitations in this study. Firstly, since the design is cross-sectional, thus it is subject to causal limitation. Future studies may want to replicate this framework using a mixed-method or longitudinal design. Secondly, since this study addresses millennial and SME workers, this result can only be inferred to a similar population.

5.2 Implications and Suggestion

The current paper contributes to a greater understanding on how work volition, organisational justice, meaningful work and millennial employees' affective wellbeing are intertwined. It offers several practical implications.

First, it points to the importance of effective implementation of an enhanced organisational structure that supports SME millennials" affective wellbeing. Specifically, organisations should nurture their employees' need to express their freedom of will and exercise more transparency in organisational processes as these relate to the importance of

distributive, interactional and formal justice to millennials' affective wellbeing. Organisations can consider implementing an effective, fair and proactive feedback policy and procedure that promotes justice at work. Supervisors and managers should support a more open communication and an inclusive decision-making approach.

Secondly, organisations should consider allowing employees to have more flexibility and opportunity to express their will and choices at work. This can be achieved through a promotion of greater flexibility and availability of options for employees to choose what is meaningful for them in relation to tasks and job choices.

Lastly, allowing millennials in SMEs to find a deeper meaning beyond extrinsic rewards or motivators is likewise crucial to improve their affective wellbeing. Henceforth, organisation must consider developing several initiatives to let them discover themselves through open tasks such as engagement in corporate social responsibility (CSR) activities which enable employees to experience more meaningful work.

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