# International journal of
# human & disaster

## Vol. 6 No. 3

<Index>

## J-INSTITUTE

# International Journal of Human & Disaster

## Effects of Hope Scale on the Psychological Well-Being and Makeup Psychology for DISASTERS Among Female College Students

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## Abstract

*Purpose:* With the economic crisis and recession caused by COVID-19, people from all over the world are facing insecurity of employment and losing hope for the future. Consequently, this study was carried out to investigate the effects of hope scale on the makeup psychology and psychological well-being among female college students in such a crisis.

*Method:* A questionnaire method was selected in this study to survey female college students in Seoul and Gyeonggi Provinces. The questionnaire consisted of demographic variables, hope scale, psychological well-being, and makeup psychology. Frequency, percentile, and average were analyzed to understand the demographic characteristics of the study subjects, and the causal relationship among hope scale, psychological well-being, and makeup psychology was examined through single regression analysis.

*Results:* In terms of the effects of hope scale on makeup psychology, only planning power was found to have a statistically significant effect on etiquette and social life, only determination on self-expression and pursuit of beauty, and both determination and planning power on satisfaction and attractiveness.

Similarly, for the effects of hope scale on psychological well-being, both determination and planning power were found to have a statistically significant effect on personal growth and self-acceptance and only determination on positive interpersonal relationship.

*Conclusion:* The psychology behind wearing makeup plays an important role in one's etiquette and social life, while serving the role of expressing and satisfying oneself. Psychological well-being seems to be affected by the existence of hope; when people with a significant level of psychologically well-being have hope, they can overcome disasters and have the willingness to express self through makeup.

[Keywords] Dispositional Hope Scale: DHS, Psychological Well-Being, Cosmetic Psychology, Female College Student, Disaster

## 1. Introduction

With the economic crisis and recession caused by COVID-19, people from all over the world are facing insecurity of employment and losing hope for the future.

Choi JO & Oh SN & Cho MS argued that prolonged COVID-19 crisis is likely to exacerbate depression and anger problems among college students[1]. In Gyeongsangbuk-do's survey which investigated the status of young adults residing in the province who are experiencing a difficult time due to COVID-19, 80~90% of the participants anticipated that COVID-19 will have a serious impact on the economy not only by reducing quality employment opportunities from companies but also reducing short-term jobs and sales of those self-employed, showing increased psychological anxiety[2].

As the spread of COVID-19 infection accelerated, the World Health Organization(WHO) declared a public health emergency of international concern against the new coronavirus disease[3], and the

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Centers for Disease Control and Prevention(CDC) emphasized the importance of preventing respiratory infections in dealing with the global spread of the disease[4].

Pastor Song Ki-Seong, in his article 'Blessed Hope is the True Power', stated that one of the most serious problems in Korean society today is that young people, in particular, have lost their hope. He further described 3-Po Generation as the generation who gave up courtship, marriage, and having kids, 5-Po Generation as the generation who also gave up buying a house and having a social relationship in addition to the three things the 3-PO Generation gave up, 7-Po generation as the 5-Po generation who also gave up their dream and hope, and N-Po generation as the generation who gave up numerous(or *n* number) things[5].

Hope is a frequently used positive word for wish, desire, and dream[6]. Gratitude is positively correlated with psychological happiness and negatively correlated with negative emotions such as anxiety, depression, and jealousy, having a significant impact on life[7].

Stotland[8] reasoned that hope is important to humans as it is what makes them act, behave, achieve something.

Snyder et al.[9] divided hope into two components: determination, an individual's perceived capacity for initiating and maintaining actions necessary to reach a goal, and planning power, an individual's perceived capacity to produce successful plans or means necessary to achieve a goal.

Living a happy life, which is the ultimate goal of human life, is often threatened by various social and environmental factors. To live a happy life is to have psychological well-being[10], and psychological perception can explain happiness from physical, social, educational aspects and appearance satisfaction[11].

Psychological well-being is a concept related to people's positive functioning when they face a challenge[12]. People with a high level of psychological well-being are highly motivated to accept themselves as who they are, to continuously explore themselves, to pursue control over the environment, to pursue meaning in life, and to realize personal growth[13].

Lee HG[14] presented psychological well-being as personal growth, positive interpersonal relationship, and self-acceptance, and Kim JH[15] identified personal growth, positive interpersonal relationship, purpose of life, self-acceptance, and environmental control as the variables of psychological well-being.

In this study, questionnaires were distributed to female college students in Seoul and Gyeonggi-do. The questionnaire consisted of question items of hope scale, makeup psychology, psychological well-being, and demographic variables in order to investigate the effects of hope scale on the makeup psychology and psychological well-being of female college students.

This study carries a significant meaning in that it provides fundamental data on female college student's psychology for the beauty marketing by investigating the relationship between hope and makeup psychology amidst COVID-19 pandemic.


## 2. Research Method and Procedures

### 2.1. Selection of sample and the data collection

This study distributed 350 questionnaires to female college students in Seoul and Gyeonggi Provinces from May 10 to June 10, 2020. Among the 350 questionnaires distributed, 335 were collected. A total of 324 copies were used for the final statistical analysis, excluding 11 unfaithful and incomplete responses. For an empirical study of the question items set to develop the scale of this study, a questionnaire method was used for female college students who are twenty years old or order. The questionnaire consisted of a total of 40 questions in the areas of hope, psychological well-being, makeup psychology, and demographic variable.

Hope, as a factor structure used by Snyder et al., Lee DH & Lim JS[16], and Choi YH & Lee HK & Lee DG[17], was divided into two factors: determination(2 items) and planning power(2 items). Following a factor analysis, 6 of the eight items were considered for the final analysis. Psychological well-being

was divided into three factors: personal growth(4 items), positive interpersonal relationship(3 items), and self-acceptance(2 items) as used by Lee HG. Among them, 4 items were considered for the final analysis. Similarly, makeup psychology was divided into 4 factors: means of expression(4 items), self-consciousness(4 items), self-confidence(2 items), pursuit of beauty(3 items) as used by Kim YH & Kim KB & Cha YR[18], Park EA[19], and Park SH[20]. Among them, 9 items were considered for the final analysis.

The questionnaire used 5-point Likert scale, and the data collected were analyzed by SPSS WIN 25.0

Frequency, percentile, and average were analyzed to understand the demographic characteristics of the study subjects, and Pearson's correlation coefficient was calculated to investigate the relationship between psychological well-being and makeup psychology. Also, Stepwise multiple regression analysis($\alpha$=.05) was performed to understand the causal relationship among hope scale, psychological well-being, and makeup psychology.

## 2.2. Research question

This study investigated the effects of hope scales on makeup psychology and psychological well-being of female college students. To this end, the following research questions are set;

Research Question 1. Does hope scale have an impact on makeup psychology?
Research Question 2. Does hope scale have an impact on psychological well-being?

# 3. Research Results

## 3.1. Demographic variables of research subjects

Below <Table 1> shows the result of frequency analysis performed to examine the demographic characteristics of the study subjects. Among the female students who participated in the survey, 128(39.5%) were in their first year of university, 84(25.9%) were in their second year, 68(21.0%) were in their third year, and 44(13.6%) were in their fourth year. 130 of them(40.1%) responded to have a boyfriend, while 194(59.9%) of them responded to have no boyfriend or lever. Regarding body image satisfaction, 140(43.2%) of them responded as 'neutral', followed by 94 'satisfied'(29.0%), 76 'dissatisfied'(23.5%) dissatisfied, 12 'very dissatisfied'(3.7%), and 2 'very satisfied'(0.6%).

292 of the participants(90.1%) have or had a full-time or a part-time job, while 32 of the participants had no employment history at all. None of the participants(0.0%) responded to have less than 200,000 won for their monthly allowance, and the monthly allowance of 60(18.5%) of the participants was between 200,000 won to 300,000 won. Similarly, 60 responded to have monthly allowance between 300,000 won and 400,000 won, 58(17.9%) responded to have between 400,000 won and 500,000 won, and 146(45.1%) responded to have more than 500,000 won. 172(53.1%) responded to spend less than 50,000 won for cosmetics per month on average, 110(34.0%) responded to between 50,000 won and 100,000 won, 26(8.0%) responded to spend between 100,000 won and 150,000 won, and 16(4.9%) responded to spend 150,000 won or more.

For a monthly average, 172(53.1%) responded to spend less than 50,000 won on beauty care, 84(25.9%) responded to spend between 50,000 won and 100,000 won, 36(11.1%) responded to spend between 100,000 won and 150,000 won, and 32(9.9%) responded to spend 150,000 won or more. 240(74.1%) of the respondents said that the Internet was the most commonly used source of information on cosmetics, 42(13.0%) recommendation from friends and acquaintances, 32(9.9%) others, 8(2.5%) beauty magazine, 2(0.6%) TV.

170(52.5%) of the respondents said that they purchase cosmetics from brand shops, followed by 94 respondents shopping online(29.0%), 36 respondents purchasing from department stores(11.1%), 22 respondents purchasing from large discount stores(6.8%), and 2(0.6%) respondents getting overseas products through direct purchase.

**Table 1.** Demographic variables of the research subjects.

| Demographic characteristics | | Frequency(N) | Percentage(%) |
|---|---|---|---|
| Grade | Freshman | 128 | 39.5 |
| | Sophomore | 84 | 25.9 |
| | Junior | 68 | 21.0 |
| | Senior | 44 | 13.6 |
| In a relationship (have a boyfriend) | Yes | 130 | 40.1 |
| | No | 194 | 59.9 |
| Satisfaction with one's own body image | Very dissatisfied | 12 | 3.7 |
| | Dissatisfied | 76 | 23.5 |
| | Neutral | 140 | 43.2 |
| | Satisfied | 94 | 29.0 |
| | Very satisfied | 2 | 0.6 |
| Have employment (full or part time) history | Yes | 292 | 90.1 |
| | No | 32 | 9.9 |
| Monthly allowance(won) | 200,000 ~300,000 | 60 | 18.5 |
| | 300,000~400,000 | 60 | 18.5 |
| | 400,000~500,000 | 58 | 17.9 |
| | 500,000 or more | 146 | 45.1 |
| Avg. monthly spending on cosmetics(won) | Less than 50,000 | 172 | 53.1 |
| | 50,000~100,000 | 110 | 34.0 |
| | 100,000~150,000 | 26 | 8.0 |
| | 150,000 or more | 16 | 4.9 |
| Avg. monthly spending on beauty care(won) | Less than 50,000 | 172 | 53.1 |
| | 50,000~100,000 | 84 | 25.9 |
| | 100,000~150,000 | 36 | 11.1 |
| | 150,000 or more | 32 | 9.9 |
| Source of information on cosmetics | TV | 2 | 0.6 |
| | Internet | 240 | 74.1 |
| | Beauty magazine | 8 | 2.5 |
| | Recommendation from friends and acquaintances | 42 | 13.0 |
| | Others | 32 | 9.9 |
| Place of cosmetics purchase | Department store | 36 | 11.1 |
| | Internet | 94 | 29.0 |
| | Brand shop | 170 | 52.5 |
| | Large discount store | 22 | 6.8 |
| | Direct overseas purchase | 2 | 0.6 |
| Total | | 324 | 100.0 |

## 3.2. Validity and reliability verification of measurement tools

Factor analysis was performed to verify the validity of the question items used in this study and to identify common factors that can serve as variables. This study selected principal component analysis as the factor extraction process to extract factors with eigenvalues greater than or equal to 1.0. Varimax rotation was carried out for factor rotation, and factor loadings, which indicate the degree of correlation between factors of each variable, of 0.5 or above were analyzed.

In addition, Cronbach's α was calculated to confirm the internal consistency between the questions

in order to verify the homogeneity of the items measured based on a multiple-item scale as shown in the following <Table 2>, <Table 3>, and <Table 4>.

**Table 2.** Factor and reliability analysis of hope scale.

| Questions | | Factor | | Communality |
|---|---|---|---|---|
| | | Determination | Planning power | |
| Hope | With my past experience, I am well prepared for the future. | .843 | .022 | **.711** |
| | My life is quite successful. | .787 | .214 | **.665** |
| | I achieve the goals I set. | .738 | .310 | **.640** |
| | I am a person who strives towards a goal. | .692 | .332 | **.589** |
| | If there is a problem, there also is a solution. | .137 | .902 | **.832** |
| | There are many ways to overcome difficulties. | .286 | .841 | **.789** |
| Eigen value | | 2.453 | 1.773 | |
| Dispersion(%) | | 40.886 | 29.549 | |
| Accumulation(%) | | 40.886 | 70.435 | |
| Reliability(Cronbach's α) | | .808 | .776 | |
| Overall Reliability | | .821 | | |
| KMO and Bartlett test | | KMO=.778, $\chi^2$=701.018 $p$<.000 | | |

**Table 3.** Analysis on psychological well-being factors and reliability.

| Questions | | Factor | | | Communality |
|---|---|---|---|---|---|
| | | Personal growth | Positive interpersonal relationship | Self-acceptance | |
| Psychological well-being | I always strive for personal development. | .836 | .145 | .226 | **.771** |
| | I am interested in and challenge new fields. | .818 | .088 | -.102 | **.686** |
| | I use my spare time for personal development. | .762 | .163 | .204 | **.649** |
| | I cherish and love myself. | .176 | .897 | .144 | **.857** |
| | I think I am happy. | .144 | .882 | .226 | **.850** |
| | Many people trust me | .111 | .165 | .870 | **.796** |
| | I have close relationships with people. | .101 | .186 | .859 | **.783** |
| Eigen value | | 2.023 | 1.701 | 1.669 | |
| Dispersion(%) | | 28.897 | 24.297 | 23.843 | |
| Accumulation(%) | | 28.897 | 53.194 | 77.037 | |
| Reliability(Cronbach's α) | | .752 | .823 | .748 | |
| Overall Reliability | | .775 | | | |
| KMO and Bartlett test | | KMO=.708, $\chi^2$=754.659 $p$<.000 | | | |

**Table 4.** Analysis on makeup psychology and reliability.

| Questions | | Factor | | | | Communality |
|---|---|---|---|---|---|---|
| | | Etiquette/ social life | Self-expression | Satisfaction, attractiveness | Pursuit of beauty | |
| Makeup psychology | I think makeup is an etiquette for others. | .887 | .054 | .092 | .028 | .799 |
| | I think makeup is part of social life. | .830 | .183 | .046 | .149 | .747 |
| | To me, makeup is a means to enhance my appearance. | -.073 | .793 | .314 | .266 | .803 |
| | I wear makeup as a means of self-management | .393 | .771 | .188 | .166 | .812 |
| | I wear makeup to groom myself | .310 | .568 | .262 | .440 | .681 |
| | When I wear makeup, I feel satisfied with myself. | .018 | .235 | .908 | .136 | .900 |
| | When I put on makeup, I look attractive. | .179 | .295 | .737 | .377 | .805 |
| | I express my personality and image with makeup. | .020 | .273 | .175 | .885 | .889 |
| | I put on makeup to express my beauty. | .294 | .225 | .467 | .647 | .774 |
| Eigen value | | 1.851 | 1.849 | 1.831 | 1.677 | |
| Dispersion(%) | | 20.565 | 20.543 | 20.348 | 18.635 | |
| Accumulation(%) | | 20.565 | 41.108 | 61.455 | 80.091 | |
| Reliability(Cronbach's α) | | .727 | .789 | .811 | .744 | |
| Overall Reliability | | .858 | | | | |
| KMO and Bartlett test | | KMO=.862, $\chi^2$=1362.897 $p$<.000 | | | | |

## 3.3. Correlation among hope, psychological well-being, and makeup psychology of female college students

In this study, the causal relationship among the variables of hope, psychological well-being, and makeup psychology was verified through correlation analysis, and the results are shown in the following <Table 5>.

The analysis found that determination, which is a sub-factor of female college students' hope, had a statistically significant correlation with all sub-factors of makeup psychology($p$<.01), except for etiquette and social life. Likewise, planning power was also found to have a statistically significant correlation with all sub-factors of makeup psychology($p$<.01), except for self-expression and pursuit of beauty.

Personal growth and positive interpersonal relationship, which are sub-factors of psychological well-being, were found to have a statistically significant correlation with all sub-factors of makeup psychology($p$<.01), except for etiquette and social life. Likewise, self-acceptance was found to have a statistically significant correlation with all sub-factors of makeup psychology($p$<.01), except for etiquette, social life, and pursuit of beauty.

**Table 5.** Analyses on the correlation among hope, psychological well-being, and makeup psychology of female college students.

| | Average | Standard deviation | Determination | Planning power | Personal growth | Positive interpersonal relation | Self-acceptance | Etiquette/ social life | Self-expression | Satisfaction /attractiveness |
|---|---|---|---|---|---|---|---|---|---|---|
| Determination | 3.489 | 0.651 | 1 | | | | | | | |
| Planning power | 3.969 | 0.646 | .482** | 1 | | | | | | |

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Personal growth | 3.613 | 0.691 | .501** | .369** | 1 | | | | | | |
| Positive interpersonal relationship | 3.904 | 0.643 | .432** | .284** | .272** | 1 | | | | | |
| Self-acceptance | 3.862 | 0.767 | .553** | .356** | .418** | .452** | 1 | | | | |
| Etiquette/ social life | 3.238 | 0.977 | -0.029 | -.194** | 0.023 | 0.051 | -0.019 | 1 | | | |
| Self-expression | 3.895 | 0.683 | .166** | 0.103 | .157** | .292** | .160** | .412** | 1 | | |
| Satisfaction/ attractiveness | 3.685 | 0.819 | .378** | .271** | .347** | .354** | .310** | .245** | .628** | 1 | |
| Pursuit of beauty | 3.660 | 0.843 | .163** | 0.080 | .199** | .183** | 0.084 | .307** | .676** | .645** | |

## 3.4. The effects of hope scale on the makeup psychology of female college students

Multiple regression analysis was performed to investigate the effects of hope scale on the makeup psychology of female college students. Specifically, hope scale was found to have an impact on etiquette and social life of makeup psychology with a multiple correlation coefficient(R) of .208 and a coefficient of determination($R^2$) of .043 or an explanatory power of 4.3%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=7.264, p<.01.

In terms of the effects of hope scale on etiquette and social life, planning power was found to have a statistically significant impact($\beta$=-.235, p<.001).

The effects of hope scale on self-expression of makeup psychology were analyzed to have a multiple correlation coefficient(R) of .168 and a coefficient of determination($R^2$) of .028 or an explanatory power of 2.8%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=4.642, p<.05.

In terms of the effects of hope scale on self-expression, determination was found to have a statistically significant impact($\beta$=-.151, p<.05).

The effects of hope scale on satisfaction and attractiveness of makeup psychology were analyzed to have a multiple correlation coefficient(R) of .392 and a coefficient of determination($R^2$) of .153 or an explanatory power of 15.3%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=29.067, p<.001.

Also, the effects of hope scale on satisfaction and attractiveness, both determination and planning power were found to have a statistically significant impact, respectively, with $\beta$=-.151 and p<.05 and $\beta$=.116, p<.05.

Similarly, the effects of hope scale on pursuit of beauty of makeup psychology were analyzed to have a multiple correlation coefficient(R) of .163 and a coefficient of determination($R^2$) of .026 or an explanatory power of 2.6%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=4.356, p<.05.

Also, the effects of hope scale on pursuit of beauty, determination was found to have a statistically significant impact($\beta$=-.161, p<.05).

Choi YH & Lee HK & Lee DG elaborated that people with a high level of hope have a positive view of interpersonal relationships, form a strong attachment with others, promote changes, and lead to positive outcomes such as improvement of psychological and physical health, showing the vital roles that hope plays.

This is in line with the observations made in this study which investigated the effects of hope scale on etiquette/social life, self-expression, satisfaction/attractiveness, and pursuit of beauty of makeup psychology. Below <Table 6> summarizes the results.

**Table 6.** The effects of hope scale on makeup psychology.

| Dependent variable | Independent variable | B | SE | β | t | sig. |
|---|---|---|---|---|---|---|
| Makeup psychology | Etiquette/ social life | (Constant) | 4.207 | .363 | | 11.598 | .000*** |
| | | Determination | .127 | .093 | .084 | 1.356 | .176 |
| | | Planning power | -.356 | .094 | -.235 | -3.775 | .000*** |
| | R=.208 R²=.043 F=7.264** Dubin-Watson 2.025 | | | | | | |
| | Self-expression | (Constant) | 3.216 | .256 | | 12.571 | .000*** |
| | | Determination | .159 | .066 | .151 | 2.411 | .016* |
| | | Planning power | .031 | .066 | .030 | .472 | .637 |
| | R=.168 R²=.028 F=4.642* Dubin-Watson 1.798 | | | | | | |
| | Satisfaction/ attractiveness | (Constant) | 1.685 | .286 | | 5.887 | .000*** |
| | | Determination | .406 | .074 | .322 | 5.500 | .000*** |
| | | Planning power | .147 | .074 | .116 | 1.978 | .049* |
| | R=.392 R²=.153 F=29.067*** Dubin-Watson 1.973 | | | | | | |
| | Pursuit of beauty | (Constant) | 2.918 | .316 | | 9.238 | .000*** |
| | | Determination | .209 | .081 | .161 | 2.567 | .011* |
| | | Planning power | .003 | .082 | .002 | .040 | .968 |
| | R=.163 R²=.026 F=4.356* Dubin-Watson 2.174 | | | | | | |

Note: *p<.05, **p<.01, ***p<.001.

## 3.5. The effects of hope scale on the psychological well-being of female college students

Multiple regression analysis was performed to investigate the effects of hope scale on the psychological well-being of female college students as shown in <Table 6> below. Specifically, hope scale was found to have an impact on personal growth with a multiple correlation coefficient(R) of .522 and a coefficient of determination(R²) of .272 or an explanatory power of 27.2%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=60.079, p<.001. In terms of the effects of hope scale on personal growth, both determination and planning power were found to have a statistically significant impact, respectively, with β=-.421 and p<.001 and β=.166, p<.01.

The effects of hope scale on positive interpersonal relationship of psychological well-being were analyzed to have a multiple correlation coefficient(R) of .441 and a coefficient of determination(R²) of .194 or an explanatory power of 19.4%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=38.674 p<.001.

In terms of the effects of hope scale on positive interpersonal relationship, determination was found to have a statistically significant impact(β=.385, p<.001).

The effects of hope scale on self-acceptance of psychological well-being were analyzed to have a multiple correlation coefficient(R) of .562 and a coefficient of determination(R²) of .316 or an explanatory power of 31.6%. In addition, the ANOVA result on the goodness of fit found the regression model appropriate and statistically significant with F=74.244, p<.001.

Also, the effects of hope scale on self-acceptance, both determination and planning power were found to have a statistically significant impact, respectively, with β=.497, p<.001 and β=.117, p<.05.

Kim YR[21] stated that disposition toward gratitude(grateful disposition) affects psycho-logical well-being. Also, Noh HS[22] demonstrated that grateful disposition can affect psychological well-being by partially mediating social support. Yang ON & Kim HK & Jeong SD[23] argued that people with healthy body and mind form a socially positive image through psychological stability, and Kim JH stated that mental, physical, and social leisure activities influence depression and have a significant

effect on personal growth, positive interpersonal relationship, and self-acceptance aspects of psychological well-being. Also, Kang MH & Lee SY[24] verified the significance of the mediating effect of hope in regard to the relationship between academic stress and psychological well-being and showed a partial mediating effect of hope. As such, they all support studies examining the effects of hope scale on psychological well-being.

**Table 7.** The effects of hope scale on makeup psychology.

| Dependent variable | Independent variable | B | SE | β | t | sig. |
|---|---|---|---|---|---|---|
| Psychological well-being | Personal growth | | | | | |
| | (Constant) | 1.349 | .224 | | 6.026 | .000*** |
| | Determination | .447 | .058 | .421 | 7.758 | .000*** |
| | Planning power | .177 | .058 | .166 | 3.050 | .002** |
| | R=.522 R²=.272 F=60.079*** Dubin-Watson 1.736 | | | | | |
| | Positive interpersonal relationship | | | | | |
| | (Constant) | 2.189 | .219 | | 9.991 | .000*** |
| | Determination | .380 | .056 | .385 | 6.730 | .000*** |
| | Planning power | .098 | .057 | .098 | 1.720 | .086 |
| | R=.441 R²=.194 F=38.674*** Dubin-Watson 1.894 | | | | | |
| | Self-acceptance | | | | | |
| | (Constant) | 1.269 | .241 | | 5.269 | .000*** |
| | Determination | .586 | .062 | .497 | 9.434 | .000*** |
| | Planning power | .139 | .063 | .117 | 2.215 | .027* |
| | R=.562 R²=.316 F=74.244*** Dubin-Watson 2.044 | | | | | |

Note: *p<.05, **p<.01, ***p<.001.

## 4. Conclusion

This study surveyed 324 female college students to investigate the effects of hope scale on psychological well-being and makeup psychology, and the results are as follows.

First, in terms of the effects of hope scale on makeup psychology, only planning power was found to have a statistically significant effect on etiquette and social life, only determination on self-expression and pursuit of beauty, and both determination and planning power on satisfaction and attractiveness.

Second, for the effects of hope scale on psychological well-being, both determination and planning power were found to have a statistically significant effect on personal growth and self-acceptance and only determination on positive interpersonal relationship.

The psychology behind wearing makeup plays an important role in one's etiquette and social life, while serving the role of expressing and satisfying oneself. Psychological well-being seems to be affected by the existence of hope; when people with a significant level of psychologically well-being have hope, they have the willingness to express self through makeup.

Based on the results of this study, the followings are suggested.

Investigating the relationship between hope scales, psychological well-being, and makeup psychology is deemed necessary especially considering the current context in which the COVID-19 pandemic persists. In addition, the direction for the beauty industry needs to be set based on such investigation for the rapidly changing society and environment.

Although, this study is highly expected to provide fundamental data for the beauty marketing industry, follow-up studies should be conducted to examine various other factors and makeup psychology in consideration of environmental changes in times of disasters.

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## 6. Appendix

### 6.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | JC | -Set of concepts ☑<br>-Design ☑<br>-Getting results ☑<br>-Analysis ☑<br>-Make a significant contribution to collection ☑<br>-Final approval of the paper ☑<br>-Corresponding ☑ |
| Corresponding Author* | JS | -Play a decisive role in modification ☑<br>-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑<br>-Participants in Drafting and Revising Papers ☑<br>-Someone who can explain all aspects of the paper ☑ |

# International Journal of Human & Disaster

## A Study on the Measure of Promotion for the Sales of Sports Licensed Products to Overcome the DISASTER of Professional Sports During the COVID-19 Period: With a Focus on the Relationship Between the Professional Sports' Quality of Service, Identification of Team, and the Brand Loyalty

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## Abstract

*Purpose:* Recently, sports marketing has been recognized in Korea as an efficient means for strengthening the brand assets for companies, and efforts are increasingly made to develop games and licensed products as a venue to maximize them. For the sports consumers, purchasing licensed products for a sports team may be a way of strengthening a mental bond with the team they support, and it is a kind of consumption behavior for the sports fans to visit the stadium and watch games in person. The purchase of licensed products from which the fans may bring profits to the club may also be said to be a consumption behavior. Therefore, the purpose of this study is to articulate and specify the effect of professional sports' quality of service on the identification of team and the brand loyalty in the professional sports market, which is experiencing difficulties such as reductions in the number of games and reductions in the number of spectators due to the COVID-19, thereby presenting a strategic plan to promote the purchase and sales of licensed products.

*Method:* In this study, as of 2021, among the professional sports spectators, those experienced in purchasing sports licensed products were targeted and gathered as the population, while the sampling method for 450 people was the convenience sampling, and the self-administration method. The questionnaires of 367 people were used as valid samples, excluding the data in which responses were insincere or any part of the survey contents were omitted. The data processing for this study was conducted but performing the frequency analysis, Cronbach's α coefficient calculation, factor analysis, and the correlation analysis by using the SPSS 25.0 Program, a statistical package program. The multiple regression was also used.

*Results:* The quality of service, identification of team, and the brand loyalty were consisted of 3, 1, and 1 factors, each respectively, and as for the reliability, the result quality factor turned out to be 3α=.882, environmental quality factor α=.785, interaction quality factor α=. 732, identification of team factor α=.901, and the brand loyalty factor turned out to be α=.912. Furthermore, as a result of performing the correlation analysis, it turned out that there was a positive(+) relationship between all of the factors. In the effect of quality of service on the identification of team and the brand loyalty, it turned out that the result quality factor, environmental quality factor, and the interaction factor of quality of service have the effect on the brand loyalty factor of the brand loyalty and the brand loyalty factor of the brand loyalty.

*Conclusion:* The quality of service turned out to have an effect on the identification of team and the brand loyalty. The quality of service in principle is excellent performance in game, and to provide fans with such excellent performance, the development of excellent players is a priority. Therefore, teams seek to build a system for fostering excellent players and provide a springboard for improving their performance. Furthermore, it is necessary to develop licensed products by using the images of players and diversify products incorporating new technologies. Beyond which, it will be helpful to increase sales online and offline and offer various discounts and events to make the experience of purchasing products easier.

## 1. Introduction

### 1.1. The needs and purpose of the study

In the modern society where a reduction of working hours took place due to working five days a week, increase of leisure time, change of lifestyle from the work centric to the leisure centric, and the improvement of standard of living, sports have caused not only a ripple effect in economic aspects as well as individual leisure and cultural aspects. In addition to which, sports are combined with local tourism and cultural products to revitalize the economy itself and also influence regional development[1][2][3]. Meanwhile, from the consumer's perspective, the sports consumption brings not only satisfaction through entertainment or emotion provided by sports itself, but also the various satisfaction through providing support for the athletes, as well as through the various emotional consumption[4].

Due to the effect of sports, many companies today use sports to emphasize their need for the corporate image enhancement and marketing revitalization while developing their sports marketing strategies, and the largest reason for doing so is the fact that various positive effects may be earned[5][6]. Today, professional clubs in Europe and the United States have various sources of income including admission fee income, sponsorship income, advertising income, television broadcasting rights, licensed product sales, and player endorsement, while making innumerable efforts by discovering growth potential for the sports licensing business[7]. In the case of Korea, with the progress of professionalization across various sports, the sports are gaining popularity from the general public, yet most of the clubs are failing to avoid deficits[8]. Furthermore, in Korea, while profits are generated from sponsorships and broadcasting rights, etc., since they are set as the income for the federation or association, admission fee income is practically the main source of income for each professional sports club, and hence, it may be said that the domestic licensing business is still premature at best[6]. Recently, in Korea, too, sports marketing has been recognized as an effective venue for strengthening the brand assets of companies, and efforts are made to develop games and accessory products as a way to maximize them. In particular, such efforts are focused on the licensing business[9].

The sales of licensed products are also growing in amateur sports as well as professional sports in the United States, and considering such circumstances, licensed sports products not only occupy a special place for the creation of finances for the sports teams or leagues, but also promotes the brand recognition for teams or leagues among the sports fans[10][11]. That is, from the perspective of sports consumers, purchasing licensed products for their sports teams may be a means of strengthening a spiritual bond with the teams they support, and the sports fans visit the stadium to watch the games in person may also be said to be a kind of consumption behavior, and the purchase of licensed products from which the fans may bring profits to the club may also be said to be a consumption behavior[12].

Therefore, the purpose of this study is to articulate and specify the effect of professional sports' quality of service on the identification of team and the brand loyalty in the professional sports market, which is experiencing difficulties such as reductions in the number of games and reductions in the number of spectators due to the COVID-19, thereby presenting a strategic plan to promote the purchase and sales of licensed products.

## 2. Research Methods

### 2.1. Subjects and sampling technique

In this study, as of 2021, among the professional sports spectators, those experienced in purchasing sports licensed products were targeted and gathered as the population, while the

sampling method for 450 people was the convenience sampling, and the self-administration method. The questionnaires of 367 people were used as valid samples, excluding the data in which responses were insincere or any part of the survey contents were omitted.

## 2.2. Measurement method

The quality of service factor was structured by modifying and supplementing the questionnaire used in the studies of Brady & Cronin(2001), Seongtae Kim(2013), Myeongtaek Oh, Woojin Jung, and Inho Park(2016), and Pilgyu Oh(2020) in line with the purposes of this study, while the Cronbach's α coefficient representing the reliability of the questionnaire turned out to be .833 for the result quality factor, .781 for the environmental quality factor, and 804 for the interaction quality factor, most of which demonstrated the reliability appropriately[13][14][15][16].

The identification of team factor was structured by modifying and supplementing the questionnaire used in the studies of Woojoon Lee, Kwangryeong Han, Wooseok Kim(2012), and Jaeyeol Seo(2020) in line with the purposes of this study, while the Cronbach's α coefficient representing the reliability of the questionnaire turned out to be .888 for the identification of team factor in the study of Jaeyeol Seo(2020), which demonstrated the reliability appropriately[17][18].

The brand loyalty factors were structured by modifying and supplementing the questionnaire used in the studies of Cronin & Taylor(1992), Anderson & Sullivan(1993), Eunyi Yoo, Sangmi Choi, and Jaeyoon Koh(2007), and Hyeonsook Shim(2012) in line with the purposes of this study, while the Cronbach's α coefficient representing the reliability of the questionnaire turned out to be .920 for the brand loyalty factor in the study of Hyeonsook Shim(2012), which demonstrated the reliability appropriately[19][20][21][22].

## 2.3. Analysis of data

The data processing of this study was conducted by using the SPSS 25.0 Program, a statistical package program, after distributing and recovering the questionnaire, excluding the data determined to be incomplete or unreliable, and by individually inputting the data which may be analyzed into the computer, then according to the purposes of data analysis and data analysis, conducted the statistical validation as follows.

First, the frequency analysis was performed to identify the general characteristics of research subjects.

Second, to validate the reliability of the questionnaires used, the Cronbach's α coefficient was calculated.

Third, the factor analysis was performed to classify the quality of service factor, identification of team factor, and the brand loyalty factor.

Fourth, the correlation analysis was performed to examine the relationship between the variables.

Fifth, the multiple regression was used to examine the effect of the quality of service factor on the identification of team factor and the brand loyalty factor, while the statistical significance level was validated at the level of .05.

## 3. Results

### 3.1. Validity and reliability of the questionnaire, correlation

In this study, the content validity of the questionnaire was secured via the consultations with experts of the related areas of research, and the exploratory factor analysis was performed to validate the construct validity. The principal components analysis was used, and the varimax method, which is an orthogonal rotation among the orthogonal rotation methods, was used for

the factor rotation. As for the factor extraction, only the factors with an eigenvalue of 1.0 or higher were selected, and the factor loading indicating the extent of correlation between each variable and factor was limited to the questionnaires with an eigenvalue of 0.5 or higher.

**Table 1.** Result of the factor analysis and reliability validation for the quality of service factor.

| Question | Result quality | Environmental quality | Interaction quality |
|---|---|---|---|
| Excellent services overall | **.799** | .327 | .090 |
| Excellent given the price | **.758** | .302 | .044 |
| Better than other clubs | **.685** | .030 | .247 |
| Services are at the level I desire | **.558** | .125 | .122 |
| Easily accessible | .184 | **.884** | .038 |
| Procedures are well organized | .254 | **.837** | .172 |
| Excellent given time and effort | .164 | **.811** | .241 |
| Issues are appropriately handled | .029 | **.761** | .297 |
| Quality services were provided | .158 | .166 | **.856** |
| Promise was delivered | .214 | .091 | **.818** |
| Staff were friendly | .206 | .178 | **.765** |
| Related personnel were helpful | .294 | .210 | **.689** |
| Eigen value | 3.214 | 2.716 | 2.289 |
| Pct of var | 18.689 | 14.584 | 13.672 |
| Cum pct | 18.689 | 33.273 | 46.945 |
| Cronbach's α | .882 | .785 | .732 |

<Table 1> illustrates that as a result of performing the factor analysis and the reliability validation for the quality of service factor, the eigenvalues of the result quality factor turned out to be 3.214(α=.882), environmental quality factor 2.716(α=.785), interaction quality factor 2.289(α= .732), and the ratio of the 3 factors explaining all variables turned out to be 46.945%.

**Table 2.** Result of the factor analysis and reliability validation for the identification of team factor.

| Question | Identification of team |
|---|---|
| I might be criticized, if I criticize the team. | **.869** |
| I call them our team. | **.844** |
| I'm Interested in what others think of the team. | **.759** |
| When I compliment them, I feel like I'm being complimented. | **.714** |
| My team's success is my success. | **.697** |
| I get angry at the media's criticism of the team. | **.602** |
| Eigen value | 3.347 |
| Pct of var | 42.127 |
| Cum pct | 42.127 |
| Cronbach's α | .901 |

<Table 2> illustrates that as a result of performing the factor analysis and the reliability validation for the identification of team factor, the eigenvalue of the identification of team factor

turned out to be 3.247($\alpha$=.901), and the ratio of 1 factor explaining the entire variable turned out to be 42.127%.

**Table 3.** Result of the factor analysis and reliability validation for the brand loyalty factor.

|  | brand loyalty |
|---|---|
| I'm satisfied with the brand. | **.845** |
| I'll buy this brand next time again. | **.811** |
| I'm willing to recommend this brand to my friends and others. | **.764** |
| I'll buy this brand even if it's somewhat expensive. | **.687** |
| I'll continue to purchase this brand in the future. | **.598** |
| Eigen value | 3.348 |
| Pct of var | 41.772 |
| Cum pct | 41.772 |
| Cronbach's $\alpha$ | .912 |

<Table 3> illustrates that as a result of performing the factor analysis and the reliability validation for the brand loyalty factor, the eigenvalue of the brand loyalty factor turned out to be 3.348($\alpha$=.912), and the ratio of 1 factor explaining the entire variable turned out to be 41.772%.

**Table 4.** Correlation analysis.

|  | Result quality | Environmental quality | Interaction quality | Identification of team | Brand loyalty |
|---|---|---|---|---|---|
| Result quality | - |  |  |  |  |
| Environmen-tal quality | .534** | - |  |  |  |
| Interaction quality | .368** | .376** | - |  |  |
| Identification of team | .524** | .387** | .254** | - |  |
| Brand loyalty | .518** | .413** | .358** | .481** | - |

Note: **p<.01.

Furthermore, in this study, the correlation analysis was performed to understand the relationship between the variables, and as a result, as illustrated in <Table 4>, there was a positive(+) relationship between all of the factors, based on which it is evident that the regression analysis is possible to understand the impact across the variables.

## 3.2. Effect of the quality of service on the identification of team

**Table 5.** Effect of the quality of service on the identification of team.

| Dependent variable / Independent variable | Goal management | | | |
|---|---|---|---|---|
| | b | Std.E | β | t |
| Result quality | .292 | .086 | .274 | 3.512*** |
| Environmental quality | .227 | .059 | .257 | 2.354** |
| Interaction quality | .264 | .082 | .236 | 3.240** |
| R² | .365 | | | |
| F | 29.382*** | | | |

Note: ***p<.001 **p<.01.

<Table 5> illustrates that the result quality factor of the quality of service(β=.274), environmental quality factor(β=.257), and the interaction factor(β=.236) have a significant effect on the identification of team factor. and the coefficient of determination turned out to be R²=.365, which has an explanatory power of 36.5%.

### 3.3. Effect of the quality of service on the brand loyalty

**Table 6.** Effect of the quality of service on the brand loyalty.

| Dependent variable / Independent variable | Brand loyalty | | | |
|---|---|---|---|---|
| | b | Std.E | β | t |
| Result quality | .317 | .066 | .310 | 5.484*** |
| Environmental quality | .303 | .049 | .325 | 4.831*** |
| Interaction quality | .258 | .081 | .197 | 2.975** |
| R² | .394 | | | |
| F | 34.321** | | | |

Note: ***p<.001 **p<.01.

<Table 6> illustrates that the result quality factor of the quality of service(β=.310), environmental quality factor(β=.325), and the interaction factor(β=.197) have a significant effect on the brand loyalty factor. and the coefficient of determination turned out to be R²=.394, which has an explanatory power of 39.45%.

### 3.4. Effect of the identification of team on the brand loyalty

**Table 7.** Effect of the identification of team on the brand loyalty.

| Dependent variable / Independent variable | Brand loyalty | | | |
|---|---|---|---|---|
| | b | Std.E | β | t |

| Identification of team | .654 | .067 | .574 | 8.831*** |
| --- | --- | --- | --- | --- |
| $R^2$ | .352 | | | |
| F | 36.567*** | | | |

<Table 7> illustrates that the identification of team factor of the identification of team($\beta$=.517) has a significant effect on the brand loyalty factor, and the coefficient of determination turned out to be $R^2$=.352, which has an explanatory power of 35.2%.

## 4. Discussion

Concerning the effect of the professional sports' quality of service on the identification of team and the brand loyalty, in the studies of Hyeongil Kwon and Mihwa Choi(2018), Choongshik Shin and Seungcheol Lee(2006), Eungu Cheon, Jonghyun Lee, and Jinbae Hong(2012), and Hyeongil Kwon and Doyoung Pyun(2009), it turned out that there is a relationship between the identification of team and the intent to watch, and the intent to purchase licensed products, making it evident that they are consistent with the results of this study[23][12][24][25]. In the studies of Baejin Park and Seonyoung Park(2016), Yongman Kim, Kyeongchun Kim, and Jin Huh(2010), it turned out that there is a relationship between the sports quality of service, identification, and the brand loyalty, providing support for the results of this study[26][27].

Furthermore, in the studies of Fink, Trail, & Anderson(2002), Wann(2002), Funk & Pastore(2000), Kwon, Trail, & Anderson(2006), Gladden & Funk(2001), and Ross(2006), the results turned out that there exists a relationship between the sports licensed product and consumer behavior, identification, loyalty, and the brand assets, thereby securing a sufficient explanatory power concerning the results of this study[28][29][30][31][32][33].

Professional sports spectators have strong affections for the teams they support, and the service or quality of the services provided by the clubs influence the image of the clubs. Hence, providing a high level of fan services not only creates confidence and friendliness for the clubs and creates a good impression for the loyal fans, but also leads to the purchasing behaviors related to the clubs or players[12]. Maintaining a positive team image and reputation for the professional sports leagues and clubs may be utilized as a useful strategy to acquire new fans while strengthening the loyalty of the existing fans. In this context, the management of visual identity or products representing the leagues and clubs which may exert a great influence on the team image of the clubs and the team loyalty of the spectators is beyond important. Furthermore, as a measure to secure the economic independence and participate more actively in the marketing activities, the business related to the licensed products is needed as a part of marketing by utilizing sports teams[34]. To ensure the success of various marketing activities and the licensing related businesses, it is necessary to understand the sports fans' behavioral factors, and in particular, in the case of the licensed product purchasers, loyalty is extremely high, and hence, the sports related knowledge, information on the teams, players, coaches, and the teams' performance records, etc., are also crucial[35].

Therefore, the licensed products ought to be manufactured and sold as having various symbolic meanings including the identity, political history, and the achievement for teams or players. Furthermore, it is urgent to secure the products' quality and design, along with various distribution networks, and cooperate with associations, clubs, and players. Together with which, in order for the licensing business to grow, the production of many types of products and the variability of the customers' fashion trends must also be reflected.

## 5. Conclusion

The purpose of this study is to articulate and specify the effect of professional sports' quality of service on the identification of team and the brand loyalty in the professional sports market, which is experiencing difficulties such as reductions in the number of games and reductions in the number of spectators due to the COVID-19, thereby presenting a strategic plan to promote the purchase and sales of licensed products.

Towards this end, by the convenience sampling, 450 people experienced in purchasing the sports licensed products among the professional sports spectators as of 2021 were surveyed, and the questionnaire survey was conducted by using the self-administration method, and among which, those of 367 people were used as valid samples, excluding the data with insincere responses.

For the data processing of this study, the SPSS 25.0 Program, a statistical package program, was used, and in line with the research hypothesis and the purposes of data analysis, a statistical validation was performed as follows, and the results of the factor analysis and the reliability analysis performed yielded that the quality of service, identification of team, and the brand loyalty was consisted of 3, 1, and 1 factor, each respectively, and as for the reliability, the result quality factor turned out to be 3α=.882, environmental quality factor α=.785, interaction quality factor α=.732, identification of team factor α=.901, and the brand loyalty factor turned out to be α=.912. Furthermore, as a result of performing the correlation analysis, it turned out that there was a positive(+) relationship between all of the factors.

In the effect of quality of service on the identification of team and the brand loyalty, it turned out that the result quality factor, environmental quality factor, and the interaction factor of quality of service have the effect on the brand loyalty factor of the brand loyalty and the brand loyalty factor of the brand loyalty. That is, it turned out that the quality of service has an effect on the identification of team and the brand loyalty.

Gathering which, the quality of service in principle is excellent performance in game, and to provide fans with such excellent performance, the development of excellent players is a priority. Therefore, teams seek to build a system for fostering excellent players and provide a springboard for improving their performance. Furthermore, it is necessary to develop licensed products by using the images of players and diversify products incorporating new technologies. Beyond which, it will be helpful to increase sales online and offline and offer various discounts and events to make the experience of purchasing products easier.

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## 7. Appendix

### 7.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | HC | -Set of concepts ☑ <br> -Design ☑ <br> -Getting results ☑ <br> -Analysis ☑ <br> -Make a significant contribution to collection ☑ <br> -Final approval of the paper ☑ <br> -Corresponding ☑ |
| orresponding Author* | CL | -Play a decisive role in modification ☑ <br> -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ <br> -Participants in Drafting and Revising Papers ☑ <br> -Someone who can explain all aspects of the paper ☑ |

# International Journal of Human & Disaster

## The Effect of the Beauty Service Quality for HUMANS on the Customer Satisfaction and the Customer Loyalty

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## Abstract

*Purpose: The quality of beauty service which directly influences the survival and growth of the industries is a crucial issue. Therefore, in this study, the effect on the customer satisfaction is examined by using the newly developed dimension of beauty service quality, and the effect of service quality on each group by mediating the customer satisfaction between the customer loyalty. The purpose of this study is to provide the basic data for attracting customers and creating profits for and in the beauty service industry through the service quality, customer loyalty, and the customer satisfaction.*

*Method: In this study, he customers using the beauty service companies were selected, and samples for each region were allocated and a total of 300 copies of the questionnaires were distributed and recovered, among which, a sample of 239 companies were tested with hypothesis. The questionnaire survey was conducted from September 1, 2020 until December 31, 2020.*

*Results: Hypothesis 1 which provides that the service quality has a significantly positive(+) effect on the customer satisfaction was partially adopted. Among the 4 sub-factors of the service quality, interaction service quality, waiting service quality, and outcome service quality have had a statistically significantly positive effect, and the environment service quality has had a significant effect on the customer satisfaction, yet was dismissed as it turned out to have a negative(-) effect.*

*Hypothesis 2 which provides that the service quality positively mediates the customer satisfaction between the customer loyalty turned out to have a partially mediating effect. Among the 4 sub-factors of the service quality, interaction service quality, waiting service quality, and outcome service quality among interaction service quality, waiting service quality, environment service quality, and outcome service quality turned out that the customer satisfaction between the customer loyalty has a statistically significantly positive(+) effect as to have a mediating effect, and environment service quality turned out to have a significantly negative(-) mediating effect on the customer satisfaction between the customer loyalty, but was dismissed.*

*Conclusion: As for the results of this study, it was confirmed that interaction service quality, waiting service quality, and outcome service quality were significantly important variables for the beauty service quality. Furthermore, customer satisfaction is very important, and it is determined that the customer loyalty also operates positively if service workers are satisfied. However, since the beauty service provides both the tangible and intangible services simultaneously, the values perceived by the users of services, that is, the users' tendencies, emotions, time leeway, and their expectations may vary from each other. Accordingly, special efforts made by the service providers are required to meet the service quality which the users of service seek. Hence, this study emphasizes that it is important to find venues to improve the service quality for the beauty services, which are highly dependent on the human services, and based on which, the satisfaction of service users was empirically reflected, and it is meaningful that it was proven as a result.*

*[Keywords]* **Beauty Service, Interaction Service, Waiting Service, Environment Service, Outcome Service**

## 1. Introduction

Amidst such a rapidly evolving economic environment, both the quantitative and qualitative growths are achieved along with the improvement of living standards. In particular, as the consumers who use beauty services increasingly demand a higher level of satisfaction, various services are provided. This means that the service quality refers to the tangible and intangible quality which the customers use and perceive[1]. That is, it may be said that, the service quality is a dynamic relationship which influences the corporate performance results, and the importance of the service quality improvement is stressed, while the ultimate goal is the customer satisfaction[2][3].

The service quality of the beauty service industry is classified into the technical quality and functional quality, and the process of the customer satisfaction is stressed upon the sub-variables of tangibility, reliability, responsiveness, and empathy, while it was claimed that the accurate evaluation of service quality may play such a decisive role in understanding the customers' needs and desires[4]. It carries the industrial characteristics in that it is not easy to uniformize and standardize, and the technical quality may be evaluated as a result of the customer satisfaction through the communication with customers by the service providers, while the functional quality is a process for the service, which may be evaluated to be the response, attitude, and trust towards the customers, etc. Therefore, as for the quality of beauty service, it is important to understand with what emotions the service recipient receives the service[5]. Therefore, as for the quality of beauty service, it is important to understand with what emotions the service recipient receives the service from the service provider.

Since the service quality may enhance the customer's preference and the emotional bond, and also increase the use by providing satisfaction, more efforts are made for marketing services[6]. Therefore, the behaviors and attitudes of the employees who interact with the customers at the service site are the factors which determine satisfactory and unsatisfactory services, and are very important factors which determine whether the customers will continue to use the service or move to other services[7]. To prevent such customer attrition, they are branding hair salons, attempting to introduce professional executive managers, and trying to take a new leap forward to strengthen the capabilities of their organization. That is, to provide high quality beauty services, efforts are made to expand and specialize with a view to emphasize the differentiation of the beauty service industry[8].

It was confirmed that the customer satisfaction was further enhanced by continuously developing differentiated customer specific services and contents, and steady improvement of beauty technologies was made in an environment where various environments and cultures may be selected[9]. The beauty service quality is a factor which largely influences the customer satisfaction, and satisfying the customers and maintaining them as loyal customers will cost less in terms of marketing strategy, and furthermore, maintaining long term relationships with the customers is a driving force which will generate profits for the beauty industry[10].

Furthermore, in the beauty service industry, it is essential to achieve the customer satisfaction via the improvement of service quality in order to maintain the existing customers[11]. Therefore, the customer loyalty operates as an important variable in a competitive market environment such as the beauty service industry, and is also an important factor practically and academically. Where the customer satisfaction increases, the customer loyalty increases, whereas the price sensitivity decreases to protect the existing customers in competitive situations, and the customers' intent to revisit is more likely to lead towards them becoming loyal customers, together with which, when visiting with acquaintances, it may provide opportunities to create new customers through the existing customers[10]. Infrastructure configuration and operation management, development and support of various contents show the importance of empathy to induce consumer purchasing behavior[12][13].

The beauty service quality has already been measured by many researchers[10][14][15] while defining the concept under a multi-dimensional structure, and as for the representative service

quality, Parasuraman A et al.[16] classified the method of measuring the service quality called "SERVQUAL" into 5 dimensions, and announced them into 22 items of measurement. However, the validity of the SERVQUAL, which measures the service quality only with differences and performance, was criticized, and a measurement model called "SERVPERF" which measures the quality with the performance alone was announced[17]. However, as for the quality of beauty service, the employee's service begins with the customer's visit to the store. Accordingly, it was determined that the SERVQUAL or SERVPERF was inadequate to measure the specificity of beauty service, and hence, the beauty service quality measurement model developed by Kwak JM & Moon JS(2020)[18] was utilized for this study, and the studies in this regard are yet insignificant. Hence, in this study, by further classifying the beauty service quality, the classification was made into the dimensions of interaction service quality(behavior, attitude, and professionalism), waiting service quality(physical environment, human environment, and waiting time), environment service quality(internal environment and external environment), outcome service quality(tangibility and customer's emotions).

Customer loyalty may be defined as the customer's intent to repurchase products and services[19], or notwithstanding the marketing attempts targeting the brand switching by competitors or others, it may be defined as the tendency to repurchase the same products or services and the tendency to repurchase favorite products or services because of their deep affections for a particular brand[20]. That is, it is a favorable attitude towards a specific brand or product, an immersion in a unique value, and is also interpreted as an intentional behavior[21][22][23]. Oliver(1981)[24] defined the customer's cognitive state as the customer satisfaction as the experience of the service results, while Fornell(1992)[25] defined it as the continuity of the trust yielding repurchases of the services and products further to satisfying the customers' needs. Examining the previous studies on loyalty and satisfaction, there are the effect of the hair salon selection factor on the customer satisfaction and loyalty[26], hair salon selection attributes and customer loyalty according to the adult males' behavior types[27], effect of the service attributes of franchised hair salons on the customer satisfaction and customer loyalty[28], and the effect of hairdresser's human service quality on the customer loyalty[29], etc., and all of such research results suggest that the greater the satisfaction for the service, the stronger the customer loyalty.

Therefore, the quality of beauty service which directly influences the survival and growth of the beauty service industry is a crucial issue. Accordingly, in this study, the effect on the customer satisfaction is examined by using the newly developed dimension of beauty service quality, and the effect of the service quality on each group by mediating the customer satisfaction between the customer loyalty. The purpose of this study is to provide the basic data for the beauty service industry to attract customers and generate profits via the service quality, customer loyalty, and the customer satisfaction.

## 2. Contents and Method

### 2.1. Research hypotheses and models

Based on the discussions and the results of previous studies in the above, the following hypotheses and research models were developed <Figure 1>.

Hypothesis #1. The service quality(interaction service quality, waiting service quality, environment service quality, and outcome service quality) will have a significantly positive(+) effect on the customer satisfaction and the customer loyalty.

Hypothesis #2. The service quality(interaction service quality, waiting service quality, environment service quality, and outcome service quality) will positively mediate the customer satisfaction among the customer loyalty.

**Figure 1.** Research model.



## 2.2. Research subjects and data analysis

As for the sampling for this study, the customers using the beauty service companies were selected, and as for the questionnaire survey method, the companies were visited in person, the background and purpose of the questionnaire survey were explained, and the survey was carried out.

As for the distribution of the questionnaires, a total of 300 copies of the questionnaires were distributed and recovered by allocating samples by region(Daejeon-Chungcheong-Sejong, Seoul-Gyeonggi-Incheon, Gyeongsangnam-do-Gyeongsangbuk-do, Jeollanam-do·Jellabuk-do, Jeju-do, and Gangwon-do), of which 239 companies were sampled and utilized for the validation of hypotheses, excluding the 61 copies of the questionnaires with insincere responses or missing values. The questionnaire survey was carried out from September 1, 2020 until December 31, 2020.

To validate the research models and research hypotheses presented in this study, SPSS 24.0 and AMOS 24.0 were used. The data collected were subjected to the frequency analysis to organize the characteristics of the sample by using SPSS 24.0, and the reliability of the measured variables was verified via the Cronbach's α to measure the reliability. In addition, the confirmatory factor analysis was performed by using AMOS 24.0, and conformity was evaluated by using model conformity indices such as CFI, TLI, and RMSEA together.

Furthermore, to validate the hypothetical model between the service quality, customer satisfaction, and the customer loyalty, the structural equation model was validated by using the AMOS 24.0 program. The correlation data were input for the model validation.

## 2.3. Tools of measurement

### 2.3.1. Service quality

To measure the service quality, a tool developed by Kwak JM & Moon JS(2020)[18] was used, and the service quality was consisted of the 4 dimensions of interaction quality, waiting quality, environment quality, and outcome quality as a multi-dimensional concept. The concept of interaction quality was defined as the service quality provided by the employees at the point of contact with the customers, and was consisted of behavior, attitude, and professionalism as for the sub-factors. The concept of waiting service quality was defined as the service quality as the physical, human environment, and waiting time provided due to the waiting situation before or during the service provision process, and was consists of physical, human environment, and waiting time as for the sub-factors. The concept of environment service quality was defined as the service quality of the internal and external environments as the background where services are provided, and was consisted of the internal and external environments as for the sub-factors. The concept of outcome service quality was defined as the extent of joy according to the services provided and the provision of the services desired, and was consisted of tangibility and customers' emotions as for the sub-factors.

### 2.3.2. Customer satisfaction

Customer satisfaction is defined as the cognitive and emotional satisfaction as response which is perceived by the customer's expectations and the consumption experience of the services provided[30]. In many previous studies, customer satisfaction has been widely used as an outcome variable, and is consisted of satisfaction and joy of the services provided[31][32]. In this study, 2 scales presented by Spreng et al.(1996)[33] were used.

### 2.3.3. Customer loyalty

Customer loyalty is defined as the act of recommending products and services to others and patronizing the provider as a regular customer through continued repurchases[34]. In this study, such sub-variables as the intent to revisit and the intent to recommend were used as the standard variables, each respectively. In this study, 2 scales presented by Taylor & Baker(1994)[35] were used.

### 2.3.4. Structure of the questionnaire

The questionnaire of this study is structured as illustrated in <Table 1> below. First, each question was measured in a self-reporting format asking the members' perceptions, and each question was measured as "Not at all" for 1 and "Absolutely agree" for 7 on a Likert's 7 point scale.

The demographic characteristics were measured by using the nominal scales. As for the statistical variables of the questionnaire, this researcher arbitrarily structured the customers who use the beauty service companies, which was consisted of region, gender, age, and educational background.

**Table 1.** Structure of the questionnaire.

| Measurement variable | | Number of questions | Survey number | Source |
|---|---|---|---|---|
| Service quality | Interaction quality | 9 | Ⅰ-1. 1~9 | Kwak JM & Moon JS(2020)[18] |
| | Waiting quality | 9 | Ⅰ-2. 1~9 | |
| | Environment quality | 6 | Ⅰ-3. 1~6 | |
| | Outcome quality | 6 | Ⅰ-4. 1~6 | |
| Customer satisfaction | | 2 | Ⅱ. 1~2 | Spreng et al.(1996)[33] |
| Customer loyalty | | 2 | Ⅲ. 1~2 | Taylor & Baker(1994)[35] |
| Statistical variable | | 4 | Ⅵ. 1~4 | Gender, age, area, education |
| Total | | 35 | | |

## 3. Results and Considerations

### 3.1. General characteristics of the research subjects

<Table 2> illustrates the general characteristics of the research subjects. In terms of the gender, 181 women(75.7%) and 58 men(24.3%) yielded a high ratio of female respondents. As for the age, 108 people(45.2%) aged 30 to 39, 86 people(36.0%) aged 20 to 29, 31 people(13.0%) aged 40 to 49, and 14 people(5.9%) aged 50 or older turned out. By region, 41 people from Daejeon, Chungcheong-do, and Sejong(17.2%), 40 people(16.7%) from each of Seoul, Gyeonggi-do, Incheon, Gyeongsangnam-do, Gyeongsangbuk-do, Jeollanam-do, Jeollabuk-do, and Jeju-do, and 38 people from Gangwon-do(15.9%) turned out. As for the educational background, 132 people(55.2%) graduated from college, 57 people(23.8%) graduated from community college, 40 people(16.7%) graduated from high school, and 10

people(4.2%) graduated from graduate school.

**Table 2.** Demographic analysis.

| | Division | Frequency(persons) | Ratio(%) |
|---|---|---|---|
| Gender | Men | 58 | 24.3 |
| | Woman | 181 | 75.7 |
| Age | 20～29 years old | 86 | 36.0 |
| | 30～39 years old | 108 | 45.2 |
| | 40～49 years old | 31 | 13.0 |
| | 50 years old or older | 14 | 5.9 |
| Area | Daejeon · Chungcheong · Sejong | 41 | 17.2 |
| | Seoul · Gyeonggi · Incheon | 40 | 16.7 |
| | Gyeongsang-do | 40 | 16.7 |
| | Jeolla-do | 40 | 16.7 |
| | Jeju Island | 40 | 16.7 |
| | Gangwon-do | 38 | 15.9 |
| Education | high school graduation | 40 | 16.7 |
| | College graduate | 57 | 23.8 |
| | University graduation | 132 | 55.2 |
| | Graduate graduation | 10 | 4.2 |
| | Total | 239 | 100.0 |

## 3.2. Analysis of feasibility and validity

As illustrated in <Table 3> below, as for the results of the feasibility analysis in this study, since the conceptual reliability and mean variance extraction values of all variables exceeded 0.70 and 0.50, it turned out that the tool of measurement of this study has the reliability and convergent validity. Furthermore, to evaluate the discriminant validity, it was verified as to whether the mean variance extraction value exceeded the square value of the correlation coefficient between the concepts[36].

The results of the reliability analysis in this study are as follows. The beauty service quality's interaction service quality(0.821), waiting quality(0.866), environment quality(0.897), outcome quality(0.862), customer satisfaction(0.985), and customer loyalty(0.970) were analyzed. The reliability analysis means the extent of internal consistency between the items of measurement for each variable, and the Cronbach's α was used for the internal consistency. The closer to 1 of the Cronbach's α, the greater the internal consistency between the items of measurement. Generally, if the Cronbach's α is equivalent to or greater than 0.6, it is an acceptable level[37].

**Table 3.** Confirmatory factor analysis.

| Construction concept | Observation | Estimate | S.E | C.R | P | SC | AVE | C.R | Cronbach's α |
|---|---|---|---|---|---|---|---|---|---|
| Interaction quality | Professionalism | 1 | | | | 0.702 | 0.604 | *0.820* | *0.821* |
| | Attitude | 1.387 | 0.114 | 12.132 | 0.000 | 0.809 | | | |
| | Behavior | 1.127 | 0.092 | 12.257 | 0.000 | 0.816 | | | |
| Waiting quality | Waiting time | 1 | | | | 0.796 | 0.701 | *0.875* | *0.866* |
| | Human environment | 0.955 | 0.060 | 15.791 | 0.000 | 0.854 | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Physical environment | 1.22 | 0.076 | 16.025 | 0.000 | 0.862 | | | |
| Environment quality | External environment | 1 | | | | 0.866 | 0.813 | *0.896* | *0.897* |
| | Internal environment | 1.123 | 0.052 | 21.738 | 0.000 | 0.936 | | | |
| Outcome quality | Customer sentiment | 1 | | | | 0.914 | 0.774 | *0.872* | *0.862* |
| | Tangible | 0.875 | 0.049 | 17.719 | 0.000 | 0.845 | | | |
| Customer satisfaction | CS1 | 1 | | | | 0.983 | 0.970 | *0.984* | *0.985* |
| | CS2 | 0.997 | 0.017 | 57.999 | 0.000 | 0.987 | | | |
| Customer Loyalty | CL2 | 1 | | | | 0.893 | 0.955 | *0.976* | *0.970* |
| | CL1 | 1.228 | 0.040 | 30.511 | 0.000 | 1.055 | | | |

X²=177.828, df=54, P=000, X²/df=3.291, GFI=.919, AGFI=.843, CFI=.971, NFI=.959, IFI=.971, TLI=.951, RMR=.020, RMSEA=.098(LO90=.082, HI90=.114)

Note: n=239.

## 3.3. Correlation analysis

The results of analyzing the correlation between the variables in this study are as illustrated in <Table 4>. As a result of the analysis performed, there was a significantly positive correlation between the interaction service quality and the customer satisfaction, which corresponds to the relationship between the independent variable and the dependent variable($r=0.674$, $p<0.001$), a significantly positive correlation between the waiting service quality and the customer satisfaction($r=0.674$, $p<0.001$), a significantly positive correlation between the environment service quality and the customer satisfaction($r=0.594$, $p<0.001$), a significantly positive correlation between the outcome service quality and the customer satisfaction($r=0.632$, $p<0.001$), a significantly positive correlation between the interaction service quality and the customer loyalty($r=0.573$, $p<0.001$), a significantly positive correlation between the waiting service quality and the customer loyalty($r=0.490$, $p<0.001$), a significantly positive correlation between the environment service quality and the customer loyalty($r=0.496$, $p<0.001$), and a significantly positive correlation between the outcome service quality and the customer loyalty($r=0.507$, $p<.001$). Furthermore, there is a significantly positive correlation($r=0.687$, $p<.001$) between the customer satisfaction and the customer loyalty, which corresponds to the relationship between the parameters and the dependent variables. This turned out to be consistent with the direction expected by the research models, when examining the statistical significance level in the correlation analysis.

**Table 4.** Correlation analysis.

| Factor | AG | SD | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|---|
| 1. Interaction quality | 5.911 | 0.727 | 1 | | | | |
| 2. Waiting quality | 5.761 | 0.686 | 0.648*** | 1 | | | |
| 3. Environment quality | 5.763 | 0.842 | 0.598*** | 0.639*** | 1 | | |
| 4. Outcome quality | 5.925 | 0.787 | 0.720*** | 0.688*** | 0.681*** | 1 | |
| 5. Customer satisfaction | 5.703 | 0.894 | 0.674*** | 0.673*** | 0.594*** | 0.632*** | 1 |
| 6. Customer loyalty | 5.715 | 1.007 | 0.573*** | 0.490*** | 0.496*** | 0.507*** | 0.687*** |

Note: n=239, ***p<0.001.

### 3.4. Validation of the effect of the service quality on the customer satisfaction and the customer loyalty

To validate the hypothesis that the service quality of Hypothesis 1 will have a significantly positive effect on the customer satisfaction, the service quality's sub-variables of interaction service quality, waiting service quality, environment service quality, and outcome service quality were used as the independent variables, while the customer satisfaction and the customer loyalty were used as the dependent variables, and the results of analysis using the structural equation model are as illustrated in <Table 5>.

When the dependent variables are the customer satisfaction and the customer loyalty, the conformity of the model is $X^2=171.394$, df=53, P=000, $X^2/dF= 3.234$, GFI=.919, AGFI=.840, CFI=.972, NFI=.960, IFI=.972, TLI=.952, RMR=.021, RMSEA=.097(LO90=.081, HI90=.113), and when compared with the general criteria of evaluation for the covariance structural analysis, the model conformity index is at a satisfactory level across the board.

Hypothesis 1-1(2.279, p<0.023), 1-2(13.511, p<0.000), 1-4(2.03<0.042), 1-5(13.511, p<0.000), which claims that the interaction service quality, waiting service quality, outcome service quality, and the customer loyalty of the service quality will have a positive effect was adopted, and Hypothesis 1-3(-3.456, p<0.000) which claimed that the environment service quality of the service quality will have a positive effect on the customer satisfaction was dismissed as it turned out to have a negative effect.

Therefore, Seo & Lee(2021)[38] found that the results of the study that the employees' polite attitude, professional and proficient techniques, and the operating hours considering the convenient use, and the interest in identifying individual needs of the customers, etc., influence the results of this study as they are supportive of the results of this study, while the results of the study of Kim & Park(2020)[39] are also supportive of this study in showing that the greater the servicing orientation of the beauty service workers, the more positive influence will be placed on the human service quality. Hence, it is believed that the more the industries value the service quality, the more continuous education and management will be required for the competency of the service providers. Furthermore, the details of the studies of Kim & Jin(2015)[40], Ji(2014)[41], Ji(2016)[42], Woo & Park(2016)[43] are supportive of the results of this study in that, the guidance and consideration of the service providers while the customers are waiting, along with the entertainments provided during the waiting hours, etc., are the behaviors influencing the positive emotions.

**Table 5.** Analytical results of the structural model(dependent variables: customer satisfaction, customer loyalty).

| Theory | Route | | | Estimate | S.E. | C.R. | p | SF |
|---|---|---|---|---|---|---|---|---|
| 1-1 | Interaction | → | CS | 0.974 | 0.427 | 2.279 | 0.023 | 0.565 |
| 1-2 | Waiting | → | CS | 0.828 | 0.061 | 13.511 | 0.000 | 0.632 |
| 1-3 | Environment | → | CS | -0.745 | 0.216 | -3.456 | 0.000 | -0.603 |
| 1-4 | Outcome | → | CS | 0.443 | 0.218 | 2.03 | 0.042 | 0.375 |
| 1-5 | CS | → | CL | 0.828 | 0.061 | 13.511 | 0.000 | 0.751 |

$X^2=171.394$, df=53, P=000, $X^2/dF= 3.234$, GFI=.919, AGFI=.840, CFI=.972, NFI=.960, IFI=.972, TLI=.952, RMR=.021, RMSEA=.097(LO90=.081, HI90=.113)

Note: n=239, ***p<0.001.

### 3.5. Validation of the mediating effect of the customer satisfaction in the relationship between the service quality and the customer loyalty

This study analyzed by using a phantom variable model, and the phantom variable is used as a method of estimating all of the indirect effects collectively[44]. As for the service quality of Hypothesis 2, to validate the hypothesis that the customer satisfaction will positively mediate between the customer loyalty, the service quality's sub-variables of interaction service quality, waiting service quality,

environment service quality, and outcome service quality were used as the independent variables, and the customer loyalty was used as a dependent variable, while the customer satisfaction was used as a parameter. The analytical results are as illustrated in <Table 6>.

When the dependent variable is customer loyalty, as illustrated in <Table 6>, the conformity of the model turned out to be X²=171.394, df=53, P=000, X²/dF= 3.234, GFI=.919, AGFI=.840, CFI=.972, NFI=.960, IFI=.972, TLI=.952, RMR=.021, RMSEA=.097(LO90=.081, HI90=.113), demonstrating that the customer satisfaction is a positive mediating effect in the relationship between the customer loyalty, and consequently, the Hypotheses 2-1, 2-2, and 2-4 were adopted accordingly. However, as for Hypothesis 2-3, environment service quality's hypothesis was dismissed since the customer satisfaction demonstrated a negative mediating effect in the relationship between the customer loyalty.

Therefore, Jang & Jeoung(2014)[45] and Park & Jung(2017)[46] support the results of this study by claiming that if and where the service users are satisfied with the results, the same which influences the customer loyalty. That is, the service providers ought to provide reasonable service fees, satisfaction with style and quality, accurate procedures, latest beauty equipments, explanation of the procedures, follow-up management, and the ability to perform procedures in line with trends. In particular, as in the study of Jeon & Kim(2016)[47], if and where a service failure arises, the prompt response and follow-up management services will enhance the customer satisfaction, and accordingly, the customer loyalty will be further strengthened.

**Table 6.** Mediating effect analysis(dependent variable: customer loyalty).

| Theory | Route | Estimate | Indirect effect | Significance level |
|--------|-------|----------|-----------------|--------------------|
| 2-1 | Interaction quality CS CL | 0.974 | 0.367 | 0.496 |
| | | 0.828 | | |
| 2-2 | Waiting quality CS CL | 0.828 | -0.617 | 0.032 |
| | | 0.828 | | |
| 2-3 | Environment quality CS CL | -0.745 | 0.686 | 0.002 |
| | | 0.828 | | |
| 2-4 | Outcome quality CS CL | 0.443 | 0.807 | 0.144 |
| | | 0.828 | | |

X²=171.394, df=53, P=000, X²/dF= 3.234, GFI=.919, AGFI=.840, CFI=.972, NFI=.960, IFI=.972, TLI=.952, RMR=.021, RMSEA=.097(LO90=.081, HI90=.113)

Note: n=239, ***p<0.001.

## 4. Conclusion

This study is meaningful in that the newly developed beauty service quality measured the mediating effect of the customer satisfaction and the customer loyalty by considering the characteristics of the area of beauty service which has reached a point of maturity. That is, the service quality was classified into the interaction service quality, waiting service quality, environment service quality, and the outcome service quality, while the relationship of influence with the customer satisfaction was validated, and the mediating effect on the customer loyalty was analyzed. Towards this end, questionnaires were prepared, and the research hypothesis was confirmed via the analysis of the data collected. The results of this study are as follows.

First, Hypothesis 1 which claimed that the service quality will have a significantly positive effect on

the customer satisfaction was partially adopted. Of the 4 sub-factors of the service quality, interaction service quality, waiting service quality, and outcome service quality have had a statistically significantly positive effect, while the environment service quality had a significant effect on the customer satisfaction, yet had a negative effect, and hence was dismissed.

Second, Hypothesis 2 which claimed that the service quality positively mediates the customer satisfaction between the customer loyalty turned out to have a partial mediating effect. Of the 4 sub-factors of service quality, interaction service quality, waiting service quality, and outcome service quality among interaction service quality, waiting service quality, environment service quality, and outcome service quality turned out such that the customer satisfaction among the customer loyalty was statistically significant to have a mediating effect, while the environment service quality turned out to have a significantly negative mediating effect on the customer satisfaction between the customer loyalty, yet was dismissed.

Gathering such results of the studies, it was confirmed that the interaction service quality, waiting service quality, and the outcome service quality were significant variables for the beauty service quality. Furthermore, the customer satisfaction is very important, and it is determined that the customer loyalty also operates positively if the service workers are satisfied. However, since the beauty service provides both tangible and intangible services simultaneously, the values perceived by the users of service, that is, the users' tendencies, emotions, time leeway, and expectations, may vary from each other. To meet the service quality sought by the service users, special efforts made by the service providers are required. In addition, in order for the arts, fashion and beauty of modern society to grow economically and develop socially, industrial application of beauty and national support are essential[48][49]. Accordingly, in this study, emphasis was placed on the fact that it is important to find venues to improve the service quality of the beauty services, which are highly dependent on the human services, and based on which, the satisfaction of the service users was empirically reflected, and it is quite meaningful in that such were proven as a result.

Meanwhile, this study has the following limitations in seeking effective venues to improve the service quality. While the subjects of the sample were nationwide, given the fact that the number of samples was small, and the fact that the effect and difference of the customer loyalty and customer satisfaction according to the franchised hair salons operated by professional executive managers and the non-franchised hair salons were not studied, this study seeks to present it as a direction for the future studies.

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# 6. Appendix

## 6.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | HJ | -Set of concepts ☑ <br> -Design ☑ <br> -Getting results ☑ <br> -Analysis ☑ <br> -Make a significant contribution to collection ☑ <br> -Final approval of the paper ☑ |
| Corresponding Author* | JP | -Corresponding ☑ <br> -Play a decisive role in modification ☑ <br> -Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ <br> -Participants in Drafting and Revising Papers ☑ <br> -Someone who can explain all aspects of the paper ☑ |

## 6.2. Funding agency

# International Journal of Human & Disaster

## DISASTER: A Study on the Manual of a Multiple-Use Facilities to Work in the Crisis Situation

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### Abstract

***Purpose:** Multi-use facilities frequently used by unspecified people can cause a lot of casualties if a crisis occurs, so prepare and train manuals for crisis situations from peacetime. Based on three years of multi-use facility crisis preparation and training consulting experience commissioned by the Ministry of Public Administration and Security, this study aims to provide development plans and policy suggestions on how to prepare and train multi-use facility manuals to operate in crisis situations.*

***Method:** To achieve the purpose of the research, the conceptual research on multi-use facility manuals and government policies were first analyzed through literature surveys, case studies on major accidents in multi-use facilities were derived through various papers and research reports, and the actual situation was analyzed based on the consulting experience of multi-use facility. Through this, it was studied by presenting development projects and policy suggestions to prepare multi-use facility manuals that can operate in crisis situations.*

***Results:** Multi-use facilities will need to analyze vulnerabilities and identify crisis types in preparation for crisis situations, organize and dress up crisis response organizations, secure and operate communication networks to control crisis situations, and re-establish training. It should also reflect guidelines on securing a command and communication network in the Ministry of Public Administration and Security's standard manual, preparing for crises linked to multi-use facilities, and long-term development plans(including securing budgets) to compensate for vulnerabilities against crises.*

***Conclusion:** The Ministry of Public Administration and Security is preparing a manual to prepare for a crisis, even though many multi-use facilities at the site need to apply it according to the facility characteristics to prepare for the crisis. Development tasks and policy suggestions presented in this study should be utilized to prepare for crisis situations by preparing manuals for crisis situations at ordinary times.*

*[Keywords] Manual, Multi-Use Facilities, Crisis, Crisis Situation, Disaster Cases*

## 1. Introduction

Multi-use facilities refer to facilities with a floor area of more than 5,000m$^2$ used by an unspecified number of people. It is a facility with a high possibility of talent because an unspecified number of people enter[1]. Therefore, the government implements a standard plan for multi-use facility crisis manual based on the Ministry of Public Safety and Security to prepare an on-site action manual considering the characteristics of each multi-use facility.

The legal basis for these measures is in Article 346, Article 43-89, Enforcement Decree of the Framework Act on Disaster and Safety Management, and Method and Standards for Preparation of Crisis Management Manual(Notice-2016.2.26.). Accordingly, owners, managers, and occupiers of multi-use facilities are required to prepare a manual for crisis situations and conduct training by the manual at least once a year, reflecting the results of the training and continuously supplementing and developing

**35**

the manual to the site[2]. In the background, 10 people died and 204 people were injured in the collapse of Mauna Resort in Gyeongju(2014.2.17) caused by heavy snow. Before that, all facilities had to be approved for use only when the fire plan was passed, so most of them were responding to the fire. However, the Mauna Resort in Gyeongju was caused by the collapse of heavy snow, not fire. That's why we can prepare for the collapse, heavy snow, flooding, gas explosions, earthquakes, and terrorism. Against this backdrop, we prepared and distributed the standards for crisis manuals('16. February') and trained a total of 3,000 people in 7 regions, multi-use facility officials, and business managers in March of the same year. The purpose of this study is to analyze the reality of the site based on experience in field consulting on multi-use facility crisis manual, find out and suggest what will be developed in terms of policy.

## 2. Theoretical Consideration

Although the concepts of the manual vary, according to the Defense Science and Technology Dictionary, it refers to documents describing how a task is performed, the materials and devices used, and the order of work. In addition, the military prepared a manual to prepare for combat sites where people's lives depended on. The so-called Field Manual(FM) is a catechism that describes instructions, intelligence, principles, and references on military education and operations. Prepare and train(a kind of manual). Although it is not easy to specify when the manual was used in the disaster field[3], the U.S. created the Disaster Management Agency(FEMA) in 1979 to standardize forest fire extinguishing response(Ministry of Public Safety and Security 2015), which led military officers to transfer military doctrine to FEMA's disaster preparedness theory. Roh Moo-hyun after the 2003 Daegu subway arson disaster response by the manual in our country actively in government. After the Ferry Sewol sinking in 2014, the Framework Act on Disaster and Safety Management was amended to prepare manuals(standard, practical, and behavior manuals) within the Framework Act and to prepare for them(Article 34-5 of the Framework Act on Disaster and Safety Management). The social interest in preparing and training multi-use facility crisis manuals began in 2014 with self-reliance in response to the collapse of Mauna Resort in Gyeongju. After this accident, the Ministry of Public Administration and Security made a standard model for preparing multi-use facilities through local governments. To this end, the Ministry of Public Administration and Security appointed commissioned members to conduct field consulting nationwide, which is a theoretical study on the results and a policy proposal.

The facility defined by the Ministry of Public Administration and Security(Article 43-8 of the Enforcement Decree of the Disaster Safety Act) is a multi-use building under Article 2(17(a)) of the Enforcement Decree of the Building Act, and the total floor area is more than 5,000 square meters. Multi-use facilities that meet the above standards shall prepare and train a crisis situation manual[4]. The Ministry of Public Administration and Security has distributed the Crisis Standards Manual and the Crisis Training Guidebook.

The The Ministry of Public Administration and Security prepared and distributed a standard manual focusing on matters that should be taken care of by facilities before handing over the on-site command to emergency rescue agencies such as fire stations to minimize damage to people and property in the event of various crises. Legal basis: Article 34-6 of the Framework Act on Disaster and Safety Management.

A person related to a multi-use facility shall prepare a manual for various crisis situations of the relevant facility and conduct training according to the crisis situations manual at least once a year. In addition, the results of the training should be reflected and continuously supplemented and developed to ensure that the crisis manual works in real-world situations without any difficulty. A fine of not more than 2 million won will be imposed for violating Article 82 of the Framework Act on Disaster and Safety Management. In the case of a fine being imposed, if a crisis situation manual is not prepared and managed, if training is not performed at least once a year, the improvement order is not fulfilled.

Matters to be included in the crisis manual(Ministry of Public Safety and Security Notice No. 2019-53) are the crisis response organization and command system, mission and role by crisis response organization, crisis response and action, damage first aid and recovery. The Ministry of Public Administration and Security has standardized seven types of crises: fire, earthquake, terrorism, water logging, heavy snow, collapse, and gas leakage.

The selection of crisis types for such facilities can be determined by reviewing them with facility officials, nearby facility officials, and related agencies(fire, police, city, county, and district). It is most important to create a manual according to the characteristics of the facility based on the standard manual, and the worst situation should be assumed based on the vulnerability of the facility[5]. Based on the standard manual, the manual must be faithfully created and trained according to the manual to properly cope with the crisis[6].

Disaster prevention teams usually implement preventive and safety inspection preparations, and in the initial stage, disaster prevention teams and field response teams respond to the crisis with their own capabilities. Subsequently, in the all-out response stage, self-reaction and joint response from related agencies will be carried out by separating them into evacuation teams, field response teams, and medical support teams, but the organization can be consolidated or expanded in accordance with the crisis, but the exemplified tasks will not be omitted.

Organization members at each crisis stage should prepare and understand individual mission cards, and at least 50% of the organization's available personnel should be organized as an evacuation task force to minimize casualties in a crisis.

In a crisis situation, initial action may vary depending on activities or crisis situations and facilities that take place within three minutes.

Multi-use facilities officials should conduct training according to the prepared crisis manual, and the matters included in the training guide book include training schedule planning, training scenario preparation, training flow and behavior, personal mission card preparation guide, crisis training checklist, evaluation report and results report.

Training can be divided into discussion-based training and practical training, and first, through discussion-based training, officials should familiarize themselves with the contents of the manual, form a consensus on training, and then master them with action.

The Ministry of Public Administration and Security conducted 571 multi-use facilities in 2017, 2018, and 2019, 114 tourist accommodations, 38 cultural and rally facilities, 12 passenger facilities, 113 religious facilities, 73 general hospitals, and 220 sales facilities.

As a result of collecting opinions from experts who participated in the consulting, there was a lack of awareness of the crisis manual in 2017, and consulting was conducted on the necessity of the crisis manual, how to write it, and the focus of writing it. In 2018-2020, most of the crisis manuals were prepared, but there were still many facilities that lacked the manual, and the training was replaced by fire drills by fire plans, and the training part according to the crisis manual was insufficient.

## 3. A Case Study on Major Disaster Response in Multi-Use Facilities

The multi-use accident case provides us with many implications. This is because multi-use facilities in Korean society are similar to other multi-use facilities due to their circumstances. In consideration of that, we will look into three recent accidents involving multi-use facilities.

### 3.1. Jecheon sports center fire accident

The first case is the fire accident at the Jecheon Sports Center. The accident occurred on December 21, 2017, when a fire broke out at Noble Fitness & Spa Sports Center in Haso-dong, Jecheon, North Chungcheong Province, killing 29 people and injuring 40 others[7]. Ten people were recovered in front of the elevator for passengers on the second floor, one in front of the restroom, and eight in front of the lounge and changing room, and nine victims were also found on the second floor or more[8]. The

implications of this accident were first, the delay in reporting the fire was the primary cause of the spread of damage[7]. Flames broke out on the ceiling during the ice removal of the Flotti-structured parking lot on the first floor, and when a customer saw the fire on the ceiling and informed the counter staff, the fire extinguisher was found in the parking lot and returned to the counter to report the fire[8].

Second, the opening of the fire doors on the emergency stairs increased the damage. Most of the victims were strangled to death, with fire doors open, and barbers on the third floor did not close during the evacuation and evacuation of guests through fire doors on the emergency stairs, which resulted in smoke and heat exposure[7]. Without the heat and smoke exposure of the emergency stairs, the chances of nine people dying above the third floor would have been high. This demonstrated the importance of practical evacuation drills.

Third, poor management of fire-fighting facilities increased the damage. The alarm valve of the sprinkler was locked and the sprinkler was not activated[9], following the power outage, and the emergency exit was used as a warehouse, which caused the damage to the fire[10]. Since unmanaged facilities cannot be operated in an emergency, they are alert and aware of the importance of normalization of fire-fighting facilities as a top priority.

Fourth, it showed the importance of maintaining the disposition of firefighters. At that time, Jecheon-si, Chungbuk, fire rescue team is understaffed, and the other went to the scene first, couldn't deploy an articulated vehicle due to cars parked illegally[11]. The mood for Koreans to report even minor inconveniences to 119 is widespread, and fire fighting also needs to establish a cooperative system of related agencies that can change their duties to police rescue teams unless it is an urgent life-saving situation such as a fire outbreak. In addition, illegal parking around multi-use facilities requires the participation of the entire nation.

Finally, there was a problem with the setting of rescue priorities through the sharing of disaster site situation information. Many people were waiting for rescue on the second floor without evacuation, but there was relatively a lot of damage on the second floor due to the concentration of rescue workers on LPG gas cover, one demander on the third floor, and four demanders on the eighth and ninth floors. The site commander would have to comprehensively judge all information at the disaster site and conduct rescue activities to minimize human casualties according to priorities.

### 3.2. A fire accident at Sejong hospital in Miryang

The second case is the fire accident at Sejong Hospital in Miryang. The accident occurred on January 26, 2018 at Sejong Hospital in 114, Jungang-ro, Miryang, South Gyeongsang Province[12]. A total of 159 people were killed and 112 injured in the accident, including a doctor and two nurses and nurses[13]. Unfortunately, six people were killed in the fire due to the suspension of the elevator, even though they were told not to take the elevator but to evacuate to the evacuation stairs in the event of a fire accident. First, the implications of the Miryang fire accident shall be taken in preference to all projects for safety facilities that are broken[14]. The sprinkler facility, a fire safety facility, did not work, but the construction was supposed to start in the last week of January because the law requires it to be installed by June 30, 2018[15]. It was sufficient to alert them that the time for the restoration of the equipment that did not work should be done in the shortest time.

Second, measures should be taken to establish and implement evacuation plans for elderly patients with mobility difficulties. The Miryang Fire Station's efforts to extinguish the fire prevented the expansion of combustion early, but many deaths occurred because patients could not escape[16]. The number of medical staff should increase as the number of beds increases and the number of inmates increases, but the hospital did not have adequate personnel, and in the meantime, the evacuation route could not be secured due to illegal expansion[16].

Third, Investments in expanding facilities, facilities, and manpower should be made first in preparation for safety accidents[17]. Son Kyung-chul, chairman of Sejong Hospital, took office in 2008, more than doubled from 3.6 billion won in annual sales to 7.4 billion won in 2016, and expanded the size of the hospital by investing 1.7 billion won in business expenses around November 2017. Eventually, the

chairman of the board as well as the head of the hospital were charged with negligence and man-slaughter.

Fourth, the site of the disaster should be left to the field commander[18]. Cheong Wa Dae Moon Jae-in, and to a national emergency management center in ten minutes after an accident fire the situation is president and ordered a thorough response.

Prime Minister Lee Nak-yeon issued an emergency order, saying, "The Office for Government Policy Coordination 2018 should use all the equipment and personnel available with the Ministry of Health and Welfare to quickly search inside the building to save lives and put out fire".

The local disaster and safety headquarters in Miryang began to operate at 8:10 on the day of the fire accident, the command was transferred to Gyeongsangnam-do at 8:23, and the fire department operated the Central Emergency Management Headquarters from 10:40 to 18:00 and transferred accident recovery duties to the Ministry of Health and Welfare. Given the above circumstances, the commander at the scene would not have been able to properly command the scene. This is because the top and middle-level command system emergency instructions are inevitable. This phenomenon can be said to "tell that the recovery of the disaster site is not in words, but depends on the dedicated efforts of the field commanders and rescue workers"[19]. The site commander's upper authority control tower requires wisdom not to interfere so that the site commander within Golden-Time can concentrate on accident recovery and rescue emergency.

### 3.3. Fire accident at Eunmyeong elementary school in Seoul

The third case is the fire accident at Eunmyeong Elementary School in Eunpyeong-gu, Seoul. It was the first fire or school building from the garbage dump, but it was a fire accident that did not cause any casualties by quickly evacuating to the fire drill according to the manual conducted by the school[20]. At that time, 11 teachers and 115 students were learning after school, including musical instruments and art classes, and teachers who found out the fire evacuated students immediately, allowing all students to evacuate safely. Two teachers on the fifth floor were evacuated and evacuated to the bathroom before being rescued by rescue teams. The accident cases at Eunmyeong Elementary School showed that the preparation and training of the manual shed light in times of crisis[21]. In particular, the dedicated leadership of the teachers on the scene is significant in that it allows them to evacuate calmly in a crisis.

## 4. Current Status of Multi-Use Facilities in Preparation for Crisis Situations

While visiting the site to prepare for a crisis in multi-use facilities, I feel a lot of rewarding about consulting, but there are many cases where I can't help but feel sorry and anxious when I see poor situations. Here are some examples of field conditions:

First, most multi-use facility manuals are not written according to the characteristics of the facility. In many cases, the standard manual provided by the Ministry of Public Administration and Security only reflects the current status of the facilities, so it is not possible to prepare for a crisis. To properly create a manual, the facility must analyze its own special vulnerabilities and prepare a manual to overcome them. Some multi-use facilities are divided into headquarters and branches and operated by region, but the facilities operated by headquarters and branches had clear differences in manual preparation depending on the degree of interest of the headquarters. At the headquarters level, most of the headquarters created a standard manual for crisis situations so that each branch would fit the characteristics of each branch. In this case, even if the branch doesn't make much effort, it is an exemplary example because the branch manager can be prepared for a crisis by following the headquarters' standard manual well, but some branches follow the headquarters' standard manual and do not supplement it at all. Additionally, there were some confusion between the standard manual for crisis situations from headquarters and the standard manual for multi-use facilities, which was submitted from the Ministry of Public Administration and Security, because each branch did not know what to do. In

this case, efforts were required to supplement the standard plan and prepare the on-site action manual of the head office and each branch by carefully determining how the contents of the Ministry of Public Administration and Security's standard manual would be merged with the head office's crisis preparation manual.

Second, manual maintenance and training were not implemented by responsible facility officials. Most multi-use facilities often entrust facility management to outsourced services, which may not be a problem in terms of facility management, but there were many problems in terms of crisis preparation. In many cases, the responsibility for writing the manual is transferred to the outsourced service facility management team, which does not have the authority and responsibility to control the entire facility, so a manual that cannot be operated in a crisis situation is prepared. Even the manuals of the facilities that passed the manuals to the outsourced service facility management team were managed in many places without even receiving signatures from facility representatives. Therefore, the multi-use facility crisis manual should be prepared by the core officer of the facility from an enterprise perspective so that the entire organization can be used to prepare for the crisis.

Third, there was no manual preparation and training for the worst-case scenario focused on facility vulnerabilities. A manual that follows the Ministry of Public Administration and Security's standard manual without reflecting the facility's characteristics cannot operate properly in a crisis situation. Since the government and local governments are telling them to make manuals, most of them are forced to make them. If a manual is created by vaguely presuming a crisis without considering the worst situation, it will eventually fail to respond properly to the crisis and cause confusion and panic.

Fourth, many people in charge of maintaining the manual have complained that they do not have time to make the manual properly because there are many additional tasks other than safety management. The person in charge of creating the manual is often responsible for writing the manual as one of the many tasks. In this case, the current work is so busy that the manual cannot be created in the worst situation, but only a formal manual that can be made most comfortable by referring to the Ministry of Public Administration and Security's standard manual. If such a manual prepares for a crisis, the facility representative will have to take responsibility for many casualties and become a criminal due to a manual that does not work properly when a real crisis occurs. Therefore, the representative of the facility acknowledges that the manual is an important task to save the facility in a crisis situation, and the person in charge of preparing the manual shall concentrate on the task for one week or one month to prepare the manual considering the characteristics of the facility. The manual that was created would work in a crisis.

Fifth, without establishing an annual training plan, only formal training results, including training photos, were maintained. Most facilities often maintain training results without having a training plan. Since the results of the training are periodically checked by administrative agencies such as local governments, the training is conducted at a level where the results are maintained for face protection. No matter how well-made a manual is, without training, it is impossible to respond to crisis situations across the company. Therefore, in order for a well-made manual to work, the training plan must be reflected in the facility's annual business plan to prepare for a crisis as much as the business project. To effectively establish a training plan, it is efficient to train in conjunction with local governments. Since local governments conduct disaster preparation drills four to six times a month, and comprehensive training is conducted once a year for safe Korean training, it would be better to schedule the training according to the local government's training plan rather than setting up a special training plan. In particular, this is because it has the advantage of being able to train in conjunction with related agencies when linked to this schedule.

Finally, the manual was not being maintained after the training. According to the history of making and revising manuals, most of the time, there is no record of maintaining manuals since the first manual was written. Training based on the manual can identify a lot of the manual supplementation requirements, so it is necessary to check the manual maintenance requirements after training and maintain the maintenance history after the manual maintenance. By doing so, even when facility officials are replaced or absent, the agent can see how to prepare for the crisis by looking at the manual.

## 5. Development Tasks and Policy Suggestions

### 5.1. Development task

Tasks to be developed based on the results of the manual and training site consultation against the crisis of multi-use facilities are as follows:

First, vulnerabilities that fit the characteristics of each facility should be analyzed and crisis types identified. The crisis should be reconstructed to meet the facilities so that it does not become a vague crisis or a vague response[22]. Simply, fire, earthquake, flooding, heavy snow, collapse, terrorism, gas leaks should not be used as suggested by the Ministry of Public Administration and Security, and the CEO should assume the worst-case scenario, specifying when, where, how, and why the crisis will occur.

Second, they need to organize crisis response organizations and dress up for missions. Each facility shall designate a field response commander(intermediate officer) separately between day and night and assign duties. In particular, each team leader shall dress up as responsible, designate a safety liability officer by building floor, and if necessary, a separate safety officer for each vulnerable facility shall be designated for each vulnerable facility. When organizing a crisis response organization, all members of the organization shall be utilized to prepare for a crisis situation and there shall be no free riders.

Third, each facility should secure a command and communication network. Some multi-use facilities usually use wireless networks to respond, but most multi-use facilities are not mentioned in the government's standard manual, so if a crisis occurs, it cannot work properly from understanding the situation to reporting[23].

Fourth, the broadcasting system shall be controlled by the field commander and shall be reflected in the peacetime training. To this end, radio must be distributed to broadcasting rooms and cell phones must not be trusted in times of crisis. This is because when faced with a crisis, cell phones are limited in communication due to exhaustion of batteries or other phone calls. In addition, field commanders and broadcasting personnel need to conduct situational propagation training during peacetime training to operate properly in times of crisis.

Fifth, it is necessary to prepare the staging area in advance and utilize it 100%. Most multi-use facilities train to evacuate from the building in parallel with fire extinguishing drills. In doing so, it is impossible to know who evacuated the building and where the people who failed to evacuate are. The rally site should be designated in consideration of the direction of the wind, and in particular, the name of the rally site should be given so that all members can recognize it together, and all agents can know it. In addition, the person in charge to report the evacuation status shall be specified in the manual to receive evacuation status from each team leader at the reunion site and report the results to the emergency rescue control team leader so that rescue and first aid can be carried out.

### 5.2. A policy suggestion

I would like to propose four major policy proposals to prepare for a multi-use facility crisis. First, the guidelines for securing the command network should be reflected in the Ministry of the Interior and Safety's standard manual. In order to control all members in a crisis, it is impossible to command in the absence of a wireless network.

Second, the crisis detection system(gas, fire, electricity, etc.) of the disaster previously built in multi-use facilities should be linked to the manual. To this end, it is necessary to request a manual maintenance service and present a standard plan after researching it professionally.

Third, long-term development plans(including budgeting) should be prepared for each facility to immediately compensate for vulnerabilities in case of a crisis. Facilities with good financial conditions can actively take measures such as installation of additional evacuation and attachment of evacuation evacuation, but multi-use facilities, which are difficult to finance, should be able to secure budget for crisis through long-term development plans.

Fourth, a system shall be established to spread accident cases to multi-use facilities in order to prevent similar accidents in advance. Currently, it is a system that allows the media to recognize the situation by facility, but it is important to analyze and study accident cases at a national level to spread accident cases so that similar accidents do not to occur.

## 6. Conclusion

Multi-use facilities are facilities with an unspecified number of people, so once a crisis occurs, many casualties are inevitable. According to the recent disaster cases, the Jecheon Sports Center fire accident and the Miryang Sejong Hospital, there are many implications for how vulnerable multi-use facilities are to crisis situations and how many casualties they cause. And the reality is that when such a crisis occurs, the facility representative has no choice but to take full responsibility for the damage.

In light of this reality, the facility representative should prioritize the maintenance and training of manuals in preparation for crisis situations. Other operating profits can give a moment of pleasure, but a crisis without preparation can destroy the tower that has been piled up in an instant.

Therefore, such important tasks should not be delegated to outsourced service providers for facility management. If the responsibility for maintaining the manual is transferred to outsourced service providers, it can endanger not only their lives but also their customers' lives in the event of a crisis. Therefore, the maintenance of the manual should give a mission to the most important relevant officer of the facility so that he/she can fully concentrate on the preparation of the manual from an enterprise perspective. This is because only when the manual is created can it work properly in a crisis situation.

In addition, policy efforts should be made at the administration level in order to be able to create a manual that can operate in situations. Since the level of manual is bound to vary depending on the ability of facility officials, the government should create a standard manual that properly reflects the situation at the site where the crisis occurs.

Currently, it is questionable whether the facility site practitioner will be able to operate properly in a crisis situation if he/she writes according to the standard manual. For example, in order to respond to a crisis from an enterprise perspective, a means of communication to control the entire organization is absolutely required. Nevertheless, most multi-use facilities are training and preparing for a crisis in the absence of a control network because there is no mention in the standard manual. All multi-use facilities also have a good system to monitor the crisis of disaster prevention rooms. Nevertheless, by not mentioning a word in the standard manual, almost all facilities are preparing for a crisis by creating a separate manual from the good system they have. Therefore, it is required to prepare and present a standard manual that can prepare for a crisis situation if the facility manager who has no expertise takes into account the characteristics of the organization using experts with extensive field experience. These efforts should not be completed once, but will be able to respond to changing situations by performing them periodically.

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## 8. Appendix

### 8.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | SK | –Set of concepts ☑<br>–Design ☑<br>–Getting results ☑<br>–Analysis ☑ |
| Corresponding Author* | CC | –Make a significant contribution to collection ☑<br>–Final approval of the paper ☑<br>–Corresponding ☑<br>–Play a decisive role in modification ☑ |
| Co-Author | ES | –Significant contributions to concepts, designs,<br>  practices, analysis and interpretation of data ☑<br>–Participants in Drafting and Revising Papers ☑<br>–Someone who can explain all aspects of the paper ☑ |

## 8.2. Funding agency

# International Journal of Human & Disaster

## The Effect of Mindfulness on the Stress Management of DISASTER Era

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## Abstract

*Purpose:* The purpose of this study is to verify the effectiveness of mindfulness in the stress management of military leaders. In the long-term situation in the COVID-19, the military leaders are increasingly anxious and also they are often exposed to extreme stress environments. Considering this situation, the contents of mindfulness were combined in leadership coaching program, and the military leaders were able to confirm the psychological well-being and stress relief after the mindfulness program before the lecture.

*Method:* For this purpose, the program was designed based on the results of previous studies and needs surveys, and the problems revealed through expert verification and preliminary program implementation were revised and supplemented. The effects of coaching lectures on subjective well-being and psychological well-being were verified by arranging 8 military leaders participants in the experimental group, the comparative group(the psychological well-being program) and the control group, respectively, with the students participating in the main executive course.

*Results:* As a result, the experimental group showed significant differences in both subjective well-being and psychological well-being of the comparative group and the control group. To measure the cognitive factors of subjective well-being, the Satisfaction With Life Scale(SWLS) developed by Diener et al.(1985) and adapted by Ryu Yeon-ji(1996) was used. This scale consists of five questions in total, and consists of seven-point scales. The emotional factors were used the Index of General Effect, which was translated by Lee Soo Il(1997). This scale is a tool to measure positive-negative emotional aspects, with a total of 9 questions, each of which is paired with two adjectives and a seven-point scale. In this study, Cronbach's value was .83 and Cronbach's value of emotional well-being was .86.

*Conclusion:* In the analysis of participants' experience reports and the observations of the hosts, it was confirmed that the experimental group who participated in the psychological well-being promotion program for the stress management of the military leaders had a positive change in the psychological well-being improvement. However, this study has a limitation in generalizing the results of the study to all military leaders because it causes sampling errors by recruiting applicants, which is a non-probable sampling method, in the recruitment of research subjects. In addition, since only 8 people were assigned to each group, it is necessary to conduct a study that has sufficient number of people considering external validity.

*[Keywords]* Mindfulness, Stress Management, Leaders, Psychological Well-Being, Subjective Well-Being

## 1. Introduction

As Corona 19 continued, the word Corona Blue came out, and the outdoor activities were reduced a lot, and people felt depressed because they were less likely to meet people. Although the importance of social distance isn't well known, but social and interpersonal activities they

engage in a daily basis have sharply declined. The number of people who feel stressed and depression has increased[1][2].

In the medical field, Koreans are reluctant to receive treatment because of prejudice against 'mental treatment' rather than depressed. This is why the suicide rate of OECD member countries is 'first' and depression treatment is 'the last place'. If left untreated for depression, 15-25% of patients attempt suicide and 2-3%, actually end suicide.

These concerns are becoming more serious after the Corona situation, and the Korean military is no exception. Suicide accidents do not stop every year. Our navy has the most combat experience compared to the Army and Air Force; emotional exhaustion from combat stress is a symptom that often occurs through contact with people. It is caused by excessive psychological needs or burdens[3]. The problem of diversity management such as life value is not well managed, and emotional exhaustion is appearing in naval soldiers. Currently, suicide accidents of soldiers are decreasing, but suicide accidents of officers are increasing[1][2][3].

Modern people's daily lives are accompanied by stress; more and more people complain of depression and helplessness as Corona 19 is prolonged. The moment of closing eyes, breathing and concentrating on the inside is called meditation; meditation, which is considered one of the mystical and religious practices, is gaining huge popularity among the public. Celebrities such as Steve Jobs, Bill Gates, and Oprah Winfrey said that life has changed with meditation, and many companies such as Apple, Nike, and Facebook have introduced in-house meditation programs, and meditation has now become a trend[3][4][5].

Since Kabat-Zinn(1982, 1990) developed a mindfulness-based stress reduction program based on mindfulness by systematizing Buddhist Wippasana meditation practices and introduced it to modern medical systems in earnest, studies that reported its effects have been increasing continuously(e.g., Bae Jae-hong, 2007; Baer, 2003; Grossman, Niemann Schmidt, & Walach, 2004). In addition, various integrated treatment programs including mindfulness meditation principles have been developed and actively applied. The representative examples are cognitive therapy based on mindfulness(mindfulness-based cognitive therapy, MBCT; Segal, Williams, & Teasdale, 2002), acceptance and commitment therapy(acceptance and commitment therapy; S.Hayes, Strosahl, & Wilson, 1999), and dialectical behavioral therapy(dialectical behavioral therapy). Behavior therapy; Linehan, 1993) and others[4][5][6][7][8][9][10].

In the studies of the field of mind and body health in Korea, mindfulness meditation program is developed and applied on its own. Considering that emotional regulation is an essential element of mental health and emotional dysregulation is a vulnerability factor for various mental disorders among the mindfulness-based interventions programs, it is meaningful to examine the emotional regulation intervention program based on mindfulness developed by Kim Jung-mo(2008)[6][7][8][10].

So, in the situation where Corona situation is prolonged, this study tries to apply mindfulness for stress management of military leaders to coaching subjects.

## 2. Theoretical Background

### 2.1. Understanding of mindfulness

Mindfulness is originally derived from Buddhist psychology and is an English translation of the palai word 'sati', which means awareness, attention, and memory. However, recently, the concept of mindfulness has been transformed from the original concept and has been reconstructed around modern psychologists.

Mindfulness performance is presented as a Wippasana or a Decision-making Center in Buddhist tradition. Western methods include MBSR, MBCT(Mindfulness Based Cognitive Therapy), MSC(Mindfulness Self Compassion), ACT(Acceptance and Commitment Therapy). However, MBCT and ACT are close to therapeutic approaches. Looking at previous studies, studies of

Western clinical, and quantitative methodologies such as scaling and mechanisms take advantage of the Western clinical. However, mindfulness is a subjective complex experience. The interpretation of statistical perspectives is not sufficient.

And mindfulness means that the mindfulness is recognized and accepted as it is in the 'field of attention' at the moment, and that it is unscathed, critical, and clearly recognizes the thoughts, feelings and senses in the present[5][6][9][10].

In the field of counseling and psychotherapy, mindfulness has been used as an auxiliary strategy to promote positive emotions, especially happiness and subjective well-being. However, recently, it has been used as an active method to prevent symptoms such as depression[10][11]. and to improve the quality of life, thereby affecting desirable human function and mental health. Fredrickson(2001) also suggested ways to promote and cultivate positive emotions, which are useful for relaxation strategies such as meditation, positive image formation, massage, and muscle relaxation, and these strategies are effective in increasing positive emotions by increasing awareness of meaning and purpose[11].

Kabat-Zinn(2005) also emphasized the importance of consciousness and said that open or receptive awareness of what is happening and mindfulness, which is attention, promotes well-being. Recent studies have also shown that mindfulness workers during the day have improved self-awareness, better control over self-behavior, and more positive emotional states[5][6][12][13].

In Korea, Won-Doori(2007) studied how this mindfulness affects well-being through what process it takes, and it was confirmed that mindfulness promotes the awareness of meaningful work, and doing meaningful work in mindfulness promotes autonomous behavior control, reduces controlled behavior control, increases positive emotions, lowers negative emotions, promotes subjective well-being and psychological well-being, and reduces depression experience[13][14].

There are many studies on the effects of mindfulness, but the research that is applied to military leaders is still insufficient. Therefore, this study intends to integrate the effects of the stress management program on the management of leadership coaching teams.

Since 2016, the Army Leadership Center has been operating a leadership coaching team to help the commander demonstrate their leadership. And also, The Ministry of National Defense has established a system to implement ROK Navy, Air forces, Marine Corps from September 2020. Leadership is not something that leaders can exercise alone, and leadership can only be exercised properly if leaders and members can dance together[2][3][4][14][15].

## 2.2. Preceding studies

In the meantime, the previous studies of mindfulness studies on quantitative methodology based on the Western clinical background, such as scaling and mechanisms, have the advantage. However, since mindfulness is a subjective and complex experience, it isn't enough to interpret the statistical viewpoint of averaging the phenomenon[15][16][17].

The key to mindfulness is to bring attention to the flow of direct sensory organs, so the method of qualitative approach, which is a direct search through experience, is more appropriate. First of all, there are limited studies on Buddhist traditions with qualitative studies on mindfulness.

Konfield focused on the experience of Wippasana concentration and investigated changes in the visual body mind. And, with Bach monks as participants, this study described the phenomenon that mindfulness is expressed as leadership in the context of everyday life. In addition, Seo Hye-seok Kang Young-sik explored the change of attitude cognitive emotion behavior and its inducement factors on the subject of life change of Wippasa and the performers[17][18][19].

However, the studies did not consider the various ways of mindfulness and it is difficult to apply to the context of universal daily life due to the characteristics of participants and methods.
On the other hand, Vinca found that the existing empathy mindfulness of the therapist affects the confidence anxiety and non-judgment of the client in the relationship between the psychotherapist

and the client performing mindfulness. But there was a limit to applying the phenomenon of special relationship called treatment to everyday life[18][19][20].

And Ahn explored the mindfulness experience of MBSR leaders and the subjects and found that the main principles of non-identity, transcendence, balance, body painting, and intrinsic are open to watch non-judgmental awareness Here and Now-the key and characteristic of full participation, which leads to the improvement of awareness, improvement of body-centered perspective, improvement of movement stress coping skills and decrease of responsiveness[20][21][22][23][24].

Considering these previous studies, our military leaders have organized stress management programs for both leaders and members of the leadership coaching team, considering the opinions of the researcher that mindfulness is needed in the situation where the command burden is increasing day by day due to various incident accidents as well as the conflict between the uncertain war aspect and the values due to the recruitment of the millennial generation[23][24][25][26].


## 3. Research Method

### 3.1. Objects of research and design of experiments

The subjects of this study were 8 of the 450 ship crews and leaders who participated in the leadership coaching team program, 8 of them were placed in the experimental group, 8 other people in the comparative group, and 8 others in the control group.

This study was conducted to investigate whether the experimental group participating in the stress management program in the leadership coaching team operation using mindfulness meditation was more effective than the control group, which didn't take any treatment, and the comparative group, which didn't take any treatment, without mindfulness meditation training.

### 3.2. Tools for inspection

### 3.2.1. Subjective well-being scale

To measure the cognitive factors of subjective well-being, the Satisfaction With Life Scale(SWLS) developed by Diener et al.(1985) and adapted by Ryu Yeon-ji(1996) was used. This scale consists of five questions in total, and consists of seven-point scales. The emotional factors were used the Index of General Effect, which was translated by Lee Soo Il(1997)[24][25][26][27][28][29]. This scale is a tool to measure positive-negative emotional aspects, with a total of 9 questions, each of which is paired with two adjectives and a seven-point scale[25][26][27][28].

### 3.2.2. Psychological well-being scale

PWBS developed by Ryff(1989) was used as a psychological well-being scale for adolescents and the scale adapted by Ryu Jung-hee and Lee Myung-ja(2007). PWBS is composed of 6 factors, 6 questions for self-acceptance, 7 questions for positive interpersonal relationship, 6 questions for autonomy, 3 questions for environmental control, 3 questions for life purpose, and 3 questions for personal growth. In the study of Ryu Jung-hee and Lee Myung-ja(2007), Cronbach's value was .74, .79, 59, .61, .63, .52 for each sub-factor[25][26][27][28][29][30].

### 3.3. Processing data

For quantitative analysis of this study, the pre- and post-test data were mixed ANOVA and the significance level to be used for statistical verification was set to .05. In addition, Tukey was performed as a post-test method to analyze the difference in effects between groups.
In order to see if there was any significant difference in each sub-factor of the test, mixed ANOVA was repeatedly conducted. The significance level was used by correcting the significance level using Bonferroni significance level correction method.

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In addition, in order to compensate for the limitations of quantitative research results according to statistical verification, the participants' observations on the participants' activities were analyzed while operating experience reports and programs that wrote the degree of change of the students themselves after each session. And also, this study reveals that the tool used in the development of psychological well-being enhancement program for high school students using mindfulness meditation, which is a research such as Kang Jin-ho in 2009, was modified and used[10][27][28][30][31][32][33].

## 3.4. Analysis and the objectives of session of program

In the analysis stage, the goal to be achieved through the psychological well-being enhancement program was stated, and the components of psychological well-being, which can be the contents of the program, were reviewed based on the literature research, and the components to be included in the program were selected through the analysis of the needs.

The stress management program for enhancing psychological well-being using mindfulness meditation to be devised in this study aims to raise the level of psychological well-being of our military leaders. Through this, we want to improve positive self-awareness and interpersonal ability, develop stress management and autonomous behavior control ability, and have concrete goals of life to help people live in the military with confidence in their growth and development. The specific goals of this program, which is designed from this point of view, are as follows: First, the soldiers should recognize their strengths and disadvantages correctly and develop their strengths. Second, it is necessary to make good relations with the crew members in the trap, to maintain good relationships, and to be kind to others. Third, it is necessary to manage stress well and to deal with it wisely. Fourth, self-control of behavior should be made to have responsibility for their military life and life.

And also, the entire program consisted of 3 sessions, and the theme of activities and the goals of each session were set to enhance psychological well-being according to the session. The sequence of the program allows participants to recognize themselves positively, accept them, develop their own strengths, and develop intimacy with others and to develop gratitude for others.

In addition, this study constructed a session based on the previous studies of Kim Kyung-soon in 2006 and Cha Kyung-ho in 2004, which were designed to deal with stress in the life process wisely, select, control, and take responsibility for their actions. The reason for using the model of previous studies is that they were able to confirm the meaning and goal of their lives through mindfulness, and they set specific goals to confirm their changes and growth so that they could live in school with confidence in their growth and development[31][32][33].

The overall program composition and presentation strategy are as follows. First, the program leader conducts mindfulness meditation training for the whole session and the second half of the session conducts activities to promote psychological well-being. Second, mindfulness meditation in session activities is not only a session activity but also a task to practice in life. The program was composed of four steps: open mind(10 minutes), active(50 minutes), sharing feelings and presenting tasks(10 minutes) with 70 minutes.

## 4. Results and Conclusion

### 4.1. Results

The results of subjective well-being are analyzed. The overall descriptive statistics of the pre and post-test for subjective well-being conducted on the experimental group, the comparative group and the control group showed that the score of the experimental group and the comparative group increased, while the control group did not change. Next, the mixed ANOVA was conducted to see if the experimental group showed significant differences in subjective well-being between the control group and the control group.

As a result, the interaction between the group and the test time was significant in subjective well-being. To find out which group among the three groups is significant, Tukey was conducted as a post-test method for the pre- and post-test of subjective well-being.

And, it was found that there was a significant difference in subjective well-being in the order of experimental group, comparative group, and control group. In order to examine the change of subjective well-being more specifically, the average score of the experimental group was improved in two sub-factors as a result of analyzing the life satisfaction and positive-negative emotion, which are the sub-factors of subjective well-being. Therefore, the mixed ANOVA was repeatedly conducted to see if the experimental group showed significant differences in each sub-factor of the comparative group and the control group and subjective well-being.

Also, the result of Mixed ANOVA was conducted to see if the experimental group showed significant differences in psychological well-being between the control group and the comparative group. The interaction between the group and the test time was significant in psychological well-being. To examine the difference of effects between the three groups, Tukey was conducted as a post-verification method for the pre and post-test of psychological well-being. In psychological well-being, there was a significant difference in the order of experimental group, comparative group, and control group. As a result of analyzing the contents of the participants' experience report, there were many statements that they became more positive when they learned how to accept the disadvantages in self-acceptance among the sub-factors of psychological well-being and that they were confident. Next, in positive interpersonal relationships, I learned how to talk with the positions of the crew members of different traps and I wanted to practice empathic conversation. In environmental control, we found that we can find unique solutions to fit the stress situation, and we have confirmed how to relieve our own stress. In autonomy, it was very beneficial to practice the body change and take care of your mind through the part that meditated and scanned the body. For the purpose of military life and life, many people recognized what they felt joy when they did their work, and stated that they had a sense of hope for the future by setting their goals specifically.

## 4.2. Conclusion

This study is valuable in that it verified the effectiveness of mindfulness in the stress management of military leaders and became a basic data for future studies on mindfulness for military leaders. Also, in the long-term circumstances of COVID-19, the leaders of our military are increasingly anxious, and they are also often exposed to extreme stress conditions. Considering this situation, the contents of mindfulness were combined in the instructional class, and the military leader was able to confirm psychological well-being and stress relief after the lecture before the lecture.

The experimental group showed significant differences in both subjective and psychological well-being of the comparative group and the control group. To measure the cognitive factors of subjective well-being, the Satisfaction With Life Scale(SWLS) developed by Diener and others was used. The research tool was adapted by Ryu Yeon-ji(1996) and the scale consisted of 5 questions in total and consisted of 7 points. The emotional factors were used the general effect index translated by Lee Soo-il(1997). This scale is a tool to measure positive negative emotional aspects, with a total of 9 questions, each paired with two adjectives and a seven-point scale. In this study, the value of Cronbach was .83 and the value of Cronbach's emotional well-being was .86.

As a result of analyzing the participants' experience reports and organizer observations, it was confirmed that the experimental group who participated in the psychological well-being promotion program for stress management of the military leader showed a positive change in the psychological well-being improvement. However, this study has limitations in generalizing the results of the study to all the leaders of the group because it causes sample errors by recruiting applicants who are non-probable sampling methods in recruiting subjects. In addition, since only 8 people are assigned to each group, it is necessary to carry out a study with sufficient personnel considering external validity in the future.

In addition, the following conclusions can be drawn through the results of this study. First, the psychological well-being enhancement program using mindfulness meditation is an effective program for the improvement of subjective well-being and psychological well-being for our soldiers. Second, it is very effective for our military leaders to use subjective mindfulness meditation to periodically improve psychological well-being programs. Third, in the analysis of participants' experience reports and the observation contents of the hosts, the experimental group that participated in the psychological well-

being enhancement program of our military leaders using mindfulness meditation showed positive changes in the psychological well-being improvement. However, this study has a limitation in generalizing the results of the study to all military leaders because it causes sampling errors by recruiting applicants, which is a non-probable sampling method, in the recruitment of research subjects. And, since only eight people were assigned to each group, studies that have sufficient number of people considering external validity should be carried out in the future.

Finally, it is necessary to develop more in-depth contents through qualitative analysis through phenomenological perspective

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## 6. Appendix

## 6.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | YL | -Set of concepts ☑<br>-Design ☑<br>-Getting results ☑<br>-Analysis ☑<br>-Make a significant contribution to collection ☑<br>-Final approval of the paper ☑ |
| Corresponding Author* | JK | -Corresponding ☑<br>-Play a decisive role in modification ☑<br>-Significant contributions to concepts, designs,<br>  practices, analysis and interpretation of data ☑<br>-Participants in Drafting and Revising Papers ☑<br>-Someone who can explain all aspects of the paper ☑ |

# International Journal of Human & Disaster

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## A Study on the DISASTER Body Response Measurement System Using VR

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## Abstract

*Purpose:* In this study, a number of industrial accidents occur, and occupational accidents caused by post-traumatic stress disorder. As a result of this occupational accident, many workers are suffering from post-traumatic stress disorder. Numerous industrial accidents occur every year, and the approval of occupational accidents caused by post-traumatic stress disorder is increasing. In particular, in the case of industrial accident trauma, workers are suffering from post-traumatic stress disorder that is more severe than other trauma patients in that workers are continuously re-exposed to the accident scene and re-experienced the accident.

*Method:* Therefore, exposure treatment techniques for patients suffering industrial acci-dent trauma using VR(virtual reality) and measurement systems introduction was necessary. Using the disaster and disaster contents developed through this research and development, measure user reaction and secure data on the degree and timing of user reaction according to each accident event, so that it is possible to obtain reference data for appropriate exposure setting according to the level of trauma became.

As a methodology, a population composition for setting the exposure level and a hypothesis design for verification and a scenario design for hypothesis testing were established.

In addition, the user reaction data for each accident event in the virtual experience was regarded as heart rate data, and a sensor and related system design that can measure data through the experiment were made, and the experiment was analyzed according to the scenario.

*Results:* So, by measuring the heart rate of the experimenter using VR(virtual reality) to experience a traumatic disaster, Measuring heart rate variability(HRV) by disaster and environmental factors and observing stress changes. It is expected that it will be possible to obtain data on the extent to which the user reacts in a specific disaster by securing a measurement value of how and at what point in time the user reacts.

*Conclusion:* This made it possible to analyze the post-traumatic disability later. In particular, through the results of this experiment, it was possible to present the need for an indicator that can objectively evaluate the effectiveness of VR content for education and objective data of the indicator.

In addition, a lot of data such as stability, movement, reaction, etc. were secured as basic indicators for the development of the "Crane VR Education Content" evaluation system.

[Keywords] *Virtual Reality, Occupational Accident, Trauma, HRV, Stress*
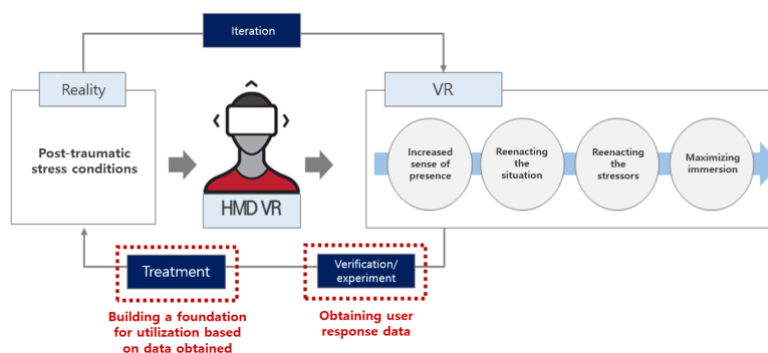
## 1. Introduction

In the case of industrial accident trauma, an accident site is a place where workers go to work every day, so workers can continuously be exposed to the accident site and experience the accident again. That's why they suffer from more severe post-traumatic stress disorder than those of other injuries and tend to be less likely to return to work[1]. However, workers do not want to appear weak and to reveal their psychological trauma to their colleagues, so not only do they avoid treatment, but they

also tend to take a long time to recover due to poor treatment[2]. Medication and cognitive/behavioral therapy are mainly utilized for these traditional phobias. However, medication is less likely to be effective in treating phobias, likely to recur and become habitual. Cognitive/behavioral therapy is also a treatment that allows a patient to overcome fear by being exposed to fear situations through imagination or real-life situations, but it also has problems in that the patient tends to have a hard time imagining fear situations and cannot face real fear situations because of the high degree of fear[3][4]. Therefore, exposure treatments using virtual reality technology are in the spotlight in the medical field to compensate for this. In particular, exposure treatments through virtual reality are drawing keen attention because therapists can randomly design and control appropriate levels of exposure to situations where they want to expose patients[5][6][7][8]. However, it is difficult to secure objective evidence data on patients' improvement conditions because conventional mental illness treatment systems rely on patients' questionnaire answers. Therefore, this study is expected to secure data on the extent to which users react in the event of a disaster by securing measurements of at what point and at what level workers react in a virtual reality system, not a questionnaire.

In the event of such an industrial disaster, the effects of posttraumatic stress disorder(PTSD) are shown in a variety of ways, including aggression, persistent avoidance, and negative changes in cognition and mood. If virtual reality and biosignal techniques are applied at the same time during PTSD treatment, the degree of improvement can be identified simultaneously, quantitatively, and objectively, depending on the patient's biological signal[9][10][11][12][13][14].

**Figure 1.** VR trauma test.



## 2. Data Measurement Design Process

Body response signal information measurement systems for heart rate, ECG recognition techniques, hardware composition, and recognition techniques used in human bodies can be divided into three main categories, as shown in <Figure 2>. It is a structure that measures sensors by attaching them to the body, obtains signal information, and transmits data to the PC.

Bio-reactive signal information measurement devices can acquire cardiac and ECG data from a single device, and receive data via the Arduino control board.

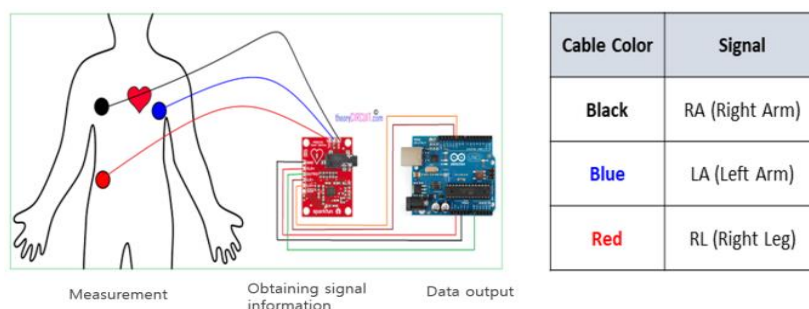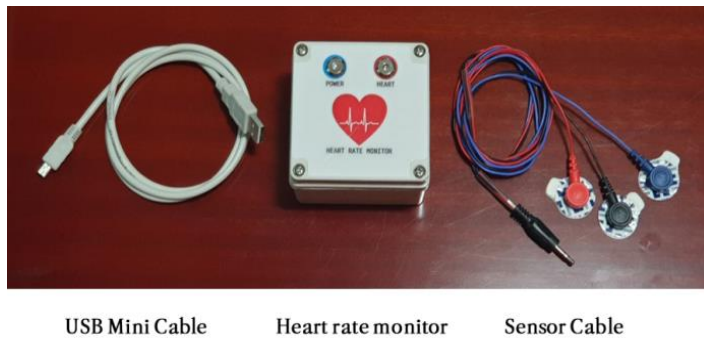**Figure 2.** Bio-reactive signal information measurement system structure.



| Cable Color | Signal |
|---|---|
| Black | RA (Right Arm) |
| Blue | LA (Left Arm) |
| Red | RL (Right Leg) |

**Figure 3.** Bio-reactive signal information measurement system.



USB Mini Cable      Heart rate monitor      Sensor Cable

The bio-reactive signal information measurement system consists of a USB cable connected to the PC, a heart rate monitor, and a sensor cable, and the bio-reactive signals are transmitted as data through Arduino software.

**Figure 4.** Arduino software for bio-reactive signal information measurement.



## 3. Data Measurement Application Case Study

Based on the above-established orientation, research hypotheses were established and experimental designs were conducted to prove the hypotheses.

The measurement elements were divided into quantitative and qualitative measurements. Quantitative measurement elements are those in which users respond to stress according to trauma situations(ex. heart rate and ECG), and for qualitative measurements, they are used for the optimization of the population by measuring the behavioral and linguistic responses of users according to trauma situations. The population for measurement was set based on gender and age groups, and the quantitative criteria for measurement time and frequency of exposure are determined by the results of the literature study and the direction of research according to the progress of the study[11][15][16][17].

### 3.1. Method of experiment and analysis

In this experiment, measurements were made at the same and stable location for subjects of various classes to maintain the same conditions as the subjects' comfortable mental and physical

conditions. Previously, to measure heart rate and ECG, electrodes are attached to the upper part of the chest area and one electrode is attached to the right abdomen. Instead, this study measures the level of the body's reaction, so while both arms are extended(easy to expose), for both men and women, electrodes are attached to both wrists one by one, and electrodes are attached to the left ankle to measure the positive induction(with the right ankle used as ground).
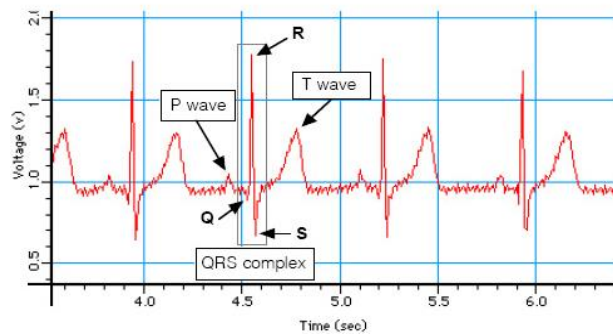
**Figure 5.** ECG graph.



**Table 1.** Items for the experiment.

| Item | Description |
| --- | --- |
| VR HMD | Samsung odyssey |
| VR contents | Crane manual |
| VR contents player | i7, GTX1080, window 10 PC |
| Heart rate monitor | Measuring HRV, ECG |

### 3.1.1. Population and sample settings

Functional design to enable subsequent trauma reduction due to industrial accidents required biometric information collection by setting up populations according to gender, age, and whether or not they had similar trauma in the past. As the possibility of reducing trauma is identified in the use of virtual reality and biometric information, samples representing each population were taken from the constructed population, and the populations for collecting bio-reactive signal information during virtual disaster experience were selected[18][19][20].

**Figure 6.** Selecting the population.

**Table 2.** The population.

| NO | Gender | Age | Number |
|----|--------|-----|--------|
| 1 | Male | 20's | 3 |
| 2 | Female | 20's | 3 |
| 3 | Male | 30's | 3 |
| 4 | Female | 30's | 3 |
| 5 | Male | 40's | 3 |
| 6 | Female | 40's | 3 |
| 7 | Male | 50's | 3 |
| 8 | Female | 50's | 3 |

### 3.1.2. VR contents

The content used in the experiment was carried out in the same section for 3 minutes.
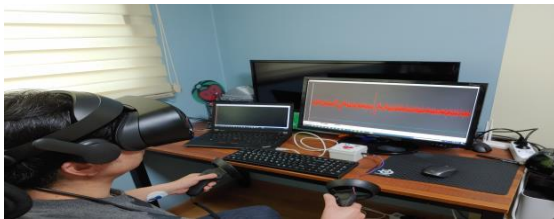
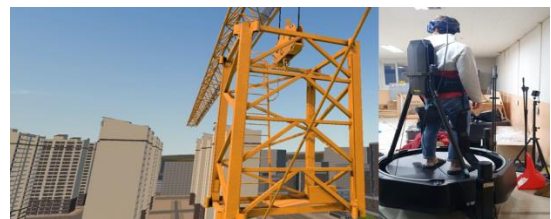**Figure 7.** ECG measurement using AR device.



**Figure 8.** VR contents main snapshot.



**Figure 9.** VR contents main snapshot.



**Figure 10.** VR contents main snapshot.



**Figure 11.** VR contents main snapshot.


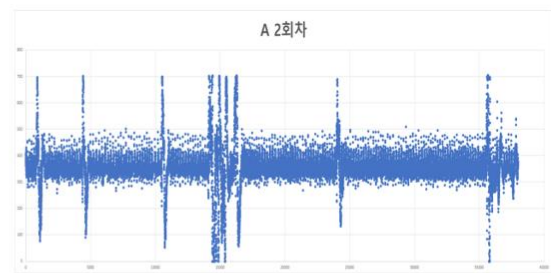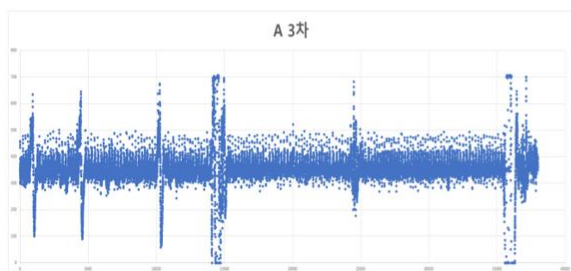
**Figure 12.** VR contents main snapshot.

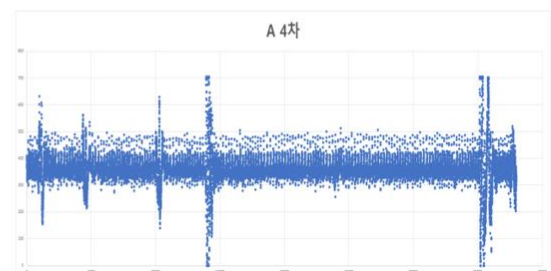**Figure 13.** Chart: A group: measured 9 times.



A 1 회차

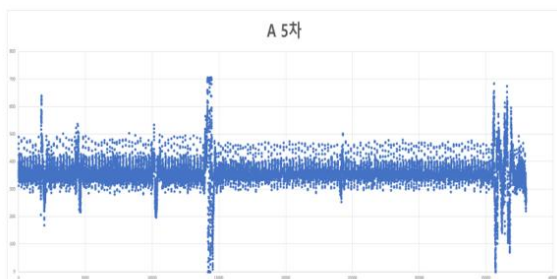Note: Stable: 32,010 / Movement: 4,415 / Reaction: 683 / Over: 892.



A 2회차

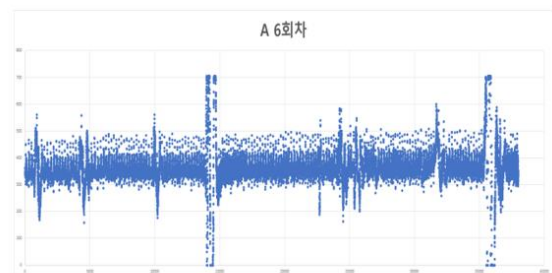Note: Stable: 31,472 / Movement: 5,122 / Reaction: 1,028 / Over: 378.



A 3차

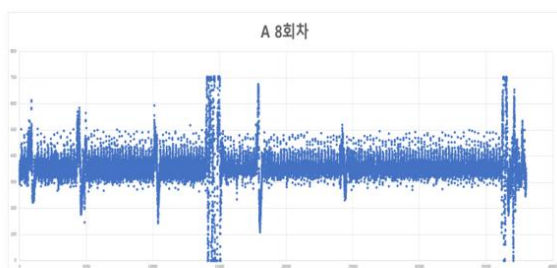Note: Stable: 31,792 / Movement: 4,693 / Reaction: 548 / Over: 967.



A 4차

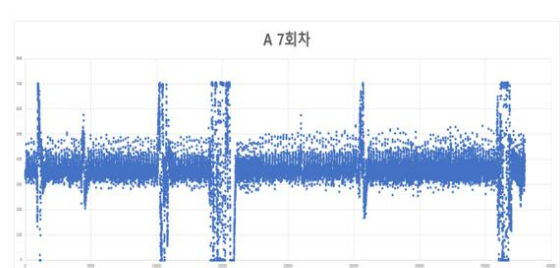Note: Stable: 32,638 / Movement: 4,702 / Reaction: 405 / Over: 255.



A 5차

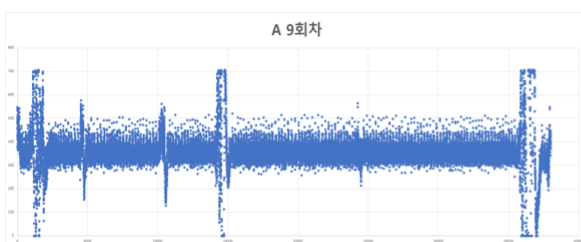Note: Stable: 33,856 / Movement : 3,597 / Reaction: 348 / Over: 199.



A 6회차

Note: Stable: 31,136 / Movement: 5,601 / Reaction: 372 / Over: 891.



A 8회차

Note: Stable: 30,402 / Movement: 5,053 / Reaction: 904 / Overr: 1,641.



A 7회차

Note: Stable: 31,883 / Movement: 4,995 / Reaction: 564 / Over: 558.



A 9회차

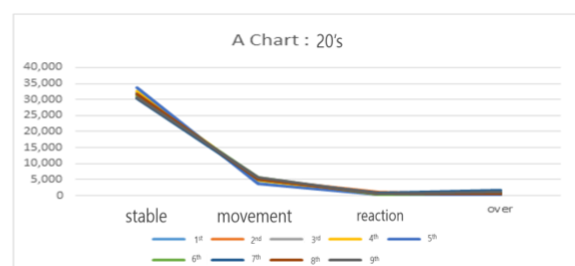Note: Stable: 30,690 / Movement: 5,527 / Reaction: 689 / Over: 1,094.



A Chart : 20's

**Table 3.** Chart: B group: measured 9 times.

| Session | Stable | Movement | Reaction | Over |
|---|---|---|---|---|
| 1 | 29,816 | 5,696 | 960 | 1,528 |
|   | 78.46% | 14.99% | 2.53% | 4.02% |
| 2 | 32,174 | 4,684 | 727 | 415 |
|   | 84.67% | 12.33% | 1.91% | 1.09% |
| 3 | 31,678 | 4,434 | 757 | 1131 |
|   | 83.36% | 11.67% | 1.99% | 2.98% |
| 4 | 33,294 | 4,151 | 281 | 274 |
|   | 87.62% | 10.92% | 0.74% | 0.72% |
| 5 | 30,309 | 6,428 | 916 | 347 |
|   | 79.76% | 16.92% | 2.41% | 0.91% |
| 6 | 33,121 | 4,559 | 163 | 157 |
|   | 87.16% | 12.00% | 0.43% | 0.41% |
| 7 | 31,672 | 4,388 | 259 | 1,681 |
|   | 83.35% | 11.55% | 0.68% | 4.42% |
| 8 | 32,071 | 4,709 | 673 | 547 |
|   | 84.40% | 12.39% | 1.77% | 1.44% |
| 9 | 31,051 | 4,934 | 736 | 1,279 |
|   | 81.71% | 12.98% | 1.94% | 3.37% |
| Avg. | 31,687 | 4,887 | 608 | 818 |
|   | 83.39% | 12.86% | 1.60% | 2.15% |

Note: B group measurement and analysis.

**Table 4.** Chart: C group: measured 9 times.

| Session | Stable | Movement | Reaction | Over |
|---|---|---|---|---|
| 1 | 32,910 | 4,199 | 335 | 556 |
|   | 86.61% | 11.05% | 0.88% | 1.46% |
| 2 | 30,753 | 6,256 | 575 | 416 |
|   | 80.93% | 16.46% | 1.51% | 1.09% |
| 3 | 32,450 | 4,144 | 475 | 931 |
|   | 85.39% | 10.91% | 1.25% | 2.45% |
| 4 | 32,788 | 4,039 | 524 | 649 |
|   | 86.28% | 10.63% | 1.38% | 1.71% |
| 5 | 32,088 | 5,311 | 312 | 289 |
|   | 84.44% | 13.98% | 0.82% | 0.76% |
| 6 | 32,114 | 5,414 | 296 | 176 |
|   | 84.51% | 14.25% | 0.78% | 0.46% |
| 7 | 32,196 | 4,972 | 428 | 404 |
|   | 84.73% | 13.08% | 1.13% | 1.06% |
| 8 | 31,862 | 5,165 | 352 | 621 |
|   | 83.85% | 13.59% | 0.93% | 1.63% |
| 9 | 31,589 | 4,975 | 386 | 1,050 |
|   | 83.13% | 13.09% | 1.02% | 2.76% |
| Avg. | 32,083 | 4,942 | 409 | 566 |
|   | 84.43% | 13.00% | 1.08% | 1.49% |

Note: C group measurement and analysis.

| Session | Stable | Movement | Reaction | Over |
|---------|--------|----------|----------|------|
| 1 | 31,616 | 4,346 | 771 | 1,267 |
| | 83.20% | 11.44% | 2.03% | 3.33% |
| 2 | 32,313 | 3,993 | 670 | 1,024 |
| | 85.03% | 10.51% | 1.76% | 2.69% |
| 3 | 34,749 | 3,162 | 80 | 9 |
| | 91.44% | 8.32% | 0.21% | 0.02% |
| 4 | 33,575 | 3,10 | 365 | 350 |
| | 88.36% | 9.76% | 0.96% | 0.92% |
| 5 | 32,871 | 4,148 | 539 | 442 |
| | 86.50% | 10.92% | 1.42% | 1.16% |
| 6 | 34,001 | 3,651 | 245 | 103 |
| | 89.48% | 9.61% | 0.64% | 0.27% |
| 7 | 32,528 | 4,445 | 495 | 532 |
| | 85.60% | 11.70% | 1.30% | 1.40% |
| 8 | 31,713 | 5,776 | 284 | 227 |
| | 83.46% | 15.20% | 0.75% | 0.60% |
| 9 | 32,559 | 4,903 | 281 | 257 |
| | 85.68% | 12.90% | 0.74% | 0.68% |
| Avg. | 32,881 | 4,237 | 414 | 468 |
| | 86.53% | 11.15% | 1.09% | 1.23% |

Note: D group measurement and analysis.

## 3.2. Measurements and results analysis

The participant response was measured by attaching a sensor module to the body of the population and setting the frequency of exposure by variable to the variable scale. The analysis of the results was focused on a comparative analysis of the degree of influence by variable and the correlation between the variables. In addition, the degree of influence by variable determined whether each variable affected the population, and the correlation between variables determined whether each variable affected the other variables.

**Table 6.** Chart: measurement of all age groups.

| Age | Stable | Movement | Reaction | Over |
|-----|--------|----------|----------|------|
| 20's | 31,687 | 4,887 | 608 | 818 |
| | 83.39% | 12.86% | 1.60% | 2.15% |
| 30's | 32,083 | 4,942 | 409 | 566 |
| | 84.4% | 13.0% | 1.1% | 1.5% |
| 40's | 32,881 | 4,237 | 414 | 468 |
| | 86.53% | 11.15% | 1.09% | 1.23% |
| 50's | 32,881 | 4,237 | 414 | 468 |
| | 86.53% | 11.15% | 1.09% | 1.23% |
| Max. | 32,881 | 4,942 | 608 | 818 |
| | 86.53% | 13.00% | 1.60% | 2.15% |
| Min. | 31,687 | 4,237 | 409 | 468 |
| | 83.39% | 11.15% | 1.08% | 1.23% |
| Avg. | 32,383 | 4,576 | 461 | 580 |
| | 85.22% | 12.04% | 1.22% | 1.53% |

For the "Crane VR training content" used in this experiment, the stability, movement, reaction, and "over," selected as the four indicators by age and gender are samples from the same population.

## 4. Conclusion

In this paper, bio-response information before and after the content experience using VR, one of the industrial equipment, was collected objectively, and various service platforms could be used by objectively judging the results and effects of human reactions. Through this experiment, we were able to present objective data of indicators that can objectively evaluate the effectiveness of educational VR content[21][22][23][24][25][26].

This is the era of smart devices that can establish a "bio-reactive signal information measuring system" that can measure heart rates and ECGs through commercial components inexpensively. This study identified problems that may arise due to the absence of physical response data indicators through VR content and objectively confirmed that there is a need to expand and study various fields based on this. Technology and indicators of bio-reaction information collection data are fundamental technologies for VR content globalization, requiring various studies.

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# 6. Appendix

## 6.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Author | CK | –Set of concepts ☑<br>–Design ☑<br>–Getting results ☑<br>–Analysis ☑<br>–Make a significant contribution to collection ☑<br>–Final approval of the paper ☑<br>–Corresponding ☑<br>–Play a decisive role in modification ☑<br>–Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑<br>–Participants in Drafting and Revising Papers ☑<br>–Someone who can explain all aspects of the paper ☑ |

## 6.2. Funding agency

# International Journal of Human & Disaster

## Preceding Factors for Life Satisfaction of University Students Majoring in Aviation Service in the COVID-19 DISASTER: Social Environment in the Classroom, Grit

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## Abstract

*Purpose: The fourth industrial revolution and prolonged COVID-19, which will bring about technological advances, are calling for changes in our universities. Therefore, it is necessary to look back on the essential meaning of education and the direction of education to examine the current status of university education. So, this study would like to look at how the social environment of the classroom affects the satisfaction of life through the student's grit.*

*Method: This study conducted on online survey of university students majoring in aviation services in consideration of the COVID-19 situation. 230 people responded, and 216 were used for the final analysis. The collected data was analyzed using the SPSS 21.0 Statistics Program. Multiple regression analysis was conducted to verify the hypothesis, and three-step mediated regression was conducted to determine the effectiveness of the grit between the social environment of the classroom and life satisfaction of students.*

*Results: First, the social environment of the classroom(emotional support between students, facilitating mutual respect and teacher's emotional support) had a significant effect on student's grit(passion). On the other hand, the social environment of the classroom had no significant impact on the student's grit(perseverance). Second, the social environment of the classroom had a significant effect on students' life satisfaction. Third, the passion among grit had a significant effect on the student's life satisfaction, but the perseverance among grit did not significantly affect students' life satisfaction. Fourth, only passion among grit showed a mediating effect between the social environment of the classroom and life satisfaction.*

*Conclusion: The higher the 'emotional support between students', 'facilitating mutual respect', and 'emotional support of teachers' among the social environment of the classroom, the higher the students' grit(passion). The impact of emotional support on students' passion for achieving long-term goals in the social environment of the classroom is a wake-up call for the role of teachers in the university setting. In addition, fulfilling the original role of university education is a way to increase the life satisfaction of university students majoring in aviation services. Due to the current COVID-19, it is difficult to conduct face-to-face classes in the department of aviation services, which includes a lot of practical subjects in the curriculum. However, it is necessary for universities to provide various non-face-to-face programs related to their majors so that students can continue their perseverance and passion through steady success experiences. If the professor provides steady emotional support in the process, students will be able to maintain high life satisfaction.*

**[Keywords]** *Social Environment in the Classroom, Grit, Life Satisfaction, Major in Aviation Service, COVID-19*

## 1. Introduction

The prolonged COVID-19 is accelerating the changes in university education that the 4th industrial revolution will bring, and the decrease in the school-age population is making the university a structure that can survive only if it changes. Due to technological innovation and rapid

industrial change[1], the future society requires talented people with the ability to present creative ideas based on basic knowledge and to derive results of convergence through communication and collaboration based on this.

However, it is not an exaggeration to say that university education before COVID-19 still remained in the school model in the era of the Industrial Revolution and provided a classroom environment that nurtures passive talent[2].

Therefore, in order to examine the current state of university education, it is necessary to look back on the essential meaning of education. The English word for education is the Latin educare, where "e" means out, and "ducare" means to lead. If so, are our classrooms at the university properly educating students to bring out their competencies? Therefore, it is necessary to study the role of the social environment of the classroom in nurturing future talents. In addition, the COVID-19 is restricting movement between countries, and it is taking a big hit to the tourism and aviation industry for a long time. Students studying related majors can be said to be losing their passion for their goals due to anxiety about their future careers.

Therefore, the role of the professor in the social environment of the university classroom is important to encourage students to develop the strength to achieve their goals despite the current adversity and hardship. In other words, if the social environment of the classroom is favorable to the students, the students actively participate in their studies, which can affect their satisfaction with their lives[3]. In addition, if the learner is actively involved in academic participation in the social environment of the classroom, it has a significant effect on academic achievement and life satisfaction. In addition, it is important to have the belief that students can grow and develop on their own while maintaining their tenacity and passion for their long-term goals, which are defined as common characteristics of high achievers in various fields[4].

Therefore, this study aims to examine the importance of the role of the classroom on the social environment for university students majoring in aviation services who are experiencing direct difficulties due to COVID-19, which has never been addressed in previous studies. Thus, it will be a timely study to see how the social environment in the university classroom influences students' passion and perseverance to overcome their anxiety about future careers and achieve their goals, as well as their satisfaction with life. In addition, this paper will be a meaningful study in terms of preparing solutions to the current university education crisis as an effort to find various ways in the future.

## 2. Theoretical Background

### 2.1. The relationship between classroom social environment, grit, and life satisfaction

The social environment of classrooms can be described separately by the support of teachers for students, the support between students, and the support of teachers who encourage respect between students[5]. Teacher support for students largely includes the concepts of cognitive academic support and emotional support. Cognitive academic support means that teachers teach students to have an interest in learning and continue to encourage students not to give up when learning is difficult[6]. Emotional support means that the professor respects students during class, makes students feel a sense of belonging, and builds trust in the professor by making students expect the professor to help whenever they need help. University education should not only provide education that creates a holistic human being, not just one-sided transfer of knowledge, but also plays a role as the final educational stage to nurture future talents that determine national competitiveness[7]. Therefore, a classroom environment that respects professor-student and student-student relationships increases students' use of self-regulated learning strategies. In addition, it has a significant effect on the goal-oriented interaction of students so that they can achieve the original purpose of university education[5].

Grit refers to persistence and passion for long-term goals, the ability to persevere in the belief that you can grow and develop yourself[4]. Grit is composed of two sub-factors: passion and perseverance. Passion means that an individual intentionally maintains an interest in a specific goal or continues to be interested in a goal that meets the expectations of others. Perseverance refers to the degree to which one shows continuous effort in one's work, and the higher the grit level, the longer it shows interest, continuous effort and passion to achieve long-term goals[8]. Antecedent variables affecting grit include organizational culture, organizational support, feedback, and job suitability[9]. To increase grit, an organizational culture that recognizes a sense of belonging, encourages challenge, improves through experience, and learns through failure is important[10]. It was confirmed that if the leadership of the leader is supported along with organizational support in this organizational culture, the employee's grit can be further increased[9][10]. The importance of emotional support as an environment that promotes grit was also mentioned. In particular, students' grit comes from teacher support and trust in students, or open and free communication between teachers and students[11].

Therefore, in this situation where the COVID-19 crisis is further accelerating the 4th industrial revolution, it is important to set the direction of university education that should nurture talented people of the future society. So it is worth paying attention to the details of social environment in the classroom. It can be inferred that providing students with opportunities for challenge and emotional support through experience in overcoming failures and adversity can be a leading factor in grit development while attending school. Accordingly, the following hypotheses were derived.

H1: The social environment of the classroom will have a significant positive effect on student grit.

Life satisfaction consists of subjective well-being and cognitive elements, which are the emotional elements of positive and negative emotions[12][13]. In other words, it can be seen as a result of cognitive evaluation of life according to individual standards. Individual happiness affects not only the individual but also the society to which he belongs, and happiness is an important factor in predicting marriage, employment, and future income by affecting physical and mental health[14][15]. Therefore, it is important to study the antecedent variables that improve the life satisfaction of students who strive to achieve their goals in a situation where the future society is not easily predicted due to rapid external environment changes. Therefore, a hypothesis was derived through the inference that the social environment of the classroom would have a significant effect as an antecedent variable that can improve university students' life satisfaction.

H2: The social environment of the classroom will have a significant positive(+) effect on the student's life satisfaction.

People with high grit are motivated to pursue their highest potential through an attitude of perseverance and involvement in their goals, which leads to psychological satisfaction. A study on the academic achievement of children and adolescents[16], a study on adaptation to school life[17], the effect of grit on life satisfaction and academic creativity of college students In a relationship study[15], grit confirmed a significant direct effect on life satisfaction. Although the future society is rapidly changing, it can be inferred that student's passion and perseverance for long-term goals also affects life satisfaction. The following hypotheses were derived:

H3: A student's grit will have a significant(+) effect on life satisfaction.

## 2.2. Mediated effect of grit

Grit has shown a mediating effect in many previous studies. In the study of the relationship between the mindset, grit, autonomy, and intention to continue study of college students, the mindset has a significant effect on the intention to continue study through grit[18]. In addition, there are research results that show that when parents provide emotional support to their

children, they develop and demonstrate their grit, which has a positive effect on personal life satisfaction. Therefore, the following hypotheses were derived by inferring that grit plays an important role in the relationship between the social environment of the classroom and the student's life satisfaction.
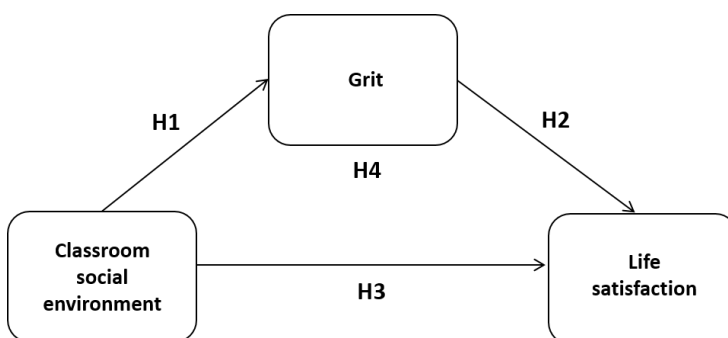
H4: Student's grit will have a significant mediating effect on the relationship between the social environment of the classroom and the student's life satisfaction.

## 3. Research Design

### 3.1. Research model

The research model for this study is as follows.

**Figure 1.** Research model.



### 3.2. Manipulative definition of variables and questionnaire composition

The measurement tools for social environment in the classroom variables are six sub-factors developed by[5], with a total of 23 questions and five-point scales: teacher's emotional support, teacher's academic support, interaction promotion, and facilitating mutual respect. emotional support between students, and academic support between students. In this study, the social environment of the classroom is defined as the teacher's support for the students, the students' mutual support, and the teacher's support for encouraging mutual respect among the students.

The grit measurement tool used eight simple scale questions consisting of four passionate questions and four perseverance questions constructed by[19]. In this study, grit is defined as passion, a state in which students majoring in aviation service management maintain interest in achieving long-term goals, and perseverance, a state in which steady effort is maintained.

The life satisfaction measurement tool used a scale translated by[20] from SWLS(The Satisfaction With Life Scale) of[12]. In this study, life satisfaction is defined by the subjective satisfaction and attitude that individual university students feel in their lives.

### 3.3. Data collection and analysis methods

This research was conducted on university students majoring in aviation services and was conducted as an online survey in consideration of the COVID-19 situation. 230 people responded, and 216 were used for the final analysis except for 14 questionnaires whose answers were not sincere. The collected data were analyzed using the SPSS 21.0 Statistics Program. First, frequency analysis was conducted to identify the demographic characteristics of the samples. Second, an exploratory factor analysis was conducted to validate the validity of the measurement tool, and the cronbach's α coefficient was calculated for reliability verification. Third, descriptive statistical analysis was conducted to identify the mean and standard deviation of the

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major variables, and correlation analysis was conducted to identify the correlation between each variable. Fourth, multiple regression analysis was conducted to verify the hypothesis, and three-step mediated regression was conducted to determine the effectiveness of the grit.

## 4. Results of Research

### 4.1. Respondent profile

The demographic characteristics of the sample are shown as below 42 men(19.4 percent) and 174 women(80.6 percent), 99 first graders(45.8 percent), 63 second graders(29.2 percent), 39 third graders(18.1 percent), and 15 fourth graders(6.9 percent). The school type is 36 students(16.7 percent) from vocational colleges and 180 students(83.3 percent) from four-year universities, followed by 75 students(34.7 percent) from North Chungcheong Province(34.7 percent), 66 from Gangwon Province(30.6 percent), 51 from South Chungcheong Province(23.6 percent), 23 from Seoul(10.6 percent) and one from South Jeolla Province(0.5 percent).

### 4.2. Verification of validity and reliability of measurement tools

The results of validation and reliability of the classroom's social environment are as follows. First, the KMO value was 0.932, and the Bartlett sphericity test found that $x^2$=5310.577(df=253, p=0.000) was a good selection of variables for factor analysis. As a result of the factor analysis, a total of 6 factors were extracted, and the cumulative variance explanatory power was found to be 86.089%. For each sub-factor, 'emotional support between students' was 15.479%, ' facilitating mutual respect 14.913%, 'teacher's academic support' 14.863%, 'student support between students' 14.841%, 'emotional support of teachers' 14.494%, 'interaction promotion' was 11.499%. The factor loading of the six factors was 0.40 or higher, indicating that the validity of the construct was verified, and the reliability was also higher than 0.60, indicating that there was no problem.

The feasibility and reliability verification results for the grit are as follows. First, the KMO value was 0.804 and the result of the Bartlett sphericity test was $x^2$=688.413(df=28, p=0.000), indicating that the selection of variables for factor analysis was good. A total of two factors were extracted, and the cumulative distributed explanatory power was 67.041%, with 35.267% of passion and 31.774% of perseverance for each sub factor. The factor loading of the two factors was 0.40 or higher, indicating that the validity of the construct was verified, and the reliability was also higher than 0.60, indicating no problem.

The feasibility and reliability verification results for the life satisfaction is as follows. First, the KMO value was 0.880 and the result of the Bartlett sphericity test was $x^2$=520.352(df=10, p=0.000), indicating that the selection of variables for factor analysis was good. A total of one factor was extracted, and the cumulative variance explanatory power was 67.545%. A factor was 0.40 or higher, indicating that the validity of the construct was verified, and the reliability was also higher than 0.60, indicating no problem.

### 4.3. Correlation verification

As a result of the correlation between each variable analysis, the emotional support of teachers, teachers' academic support, interaction promotion, facilitating mutual respect, emotional support between students, and academic support between students, which are sub-factors of the social environment of the classroom, were statistically significant positive(+) correlation on grit(passion)(p<.001), and there was a statistically significant positive(+) correlation with life satisfaction(p<.001). Also, grit(passion) was found to have a statistically significant positive(+) correlation with life satisfaction(p<.001).

### 4.4. Hypothesis validation

<Table 1> shows the results of multiple regression analysis to verify the effect of classroom social environment on students' grit. First, the explanation of the regression model for the student's passion was 37.4%, and the regression equation was analyzed to be statistically significant(F=20.809, p<.001). By independent variable, emotional support between students(β=.221, p<.01), facilitating mutual respect(β=.188, p<.05), and teachers' emotional support(β=.166, p<.05) was found to have a statistically significant positive(+) effect on passion. Therefore, students' passion increases when emotional support between students, facilitating mutual respect, and teacher's emotional support increases.

Furthermore, the explanation of the regression model for students' perseverance was 3.8%, and the regression equation was not statistically significant(F=1.377, p>.05). Thus, the social environment of the classroom may not have a significant impact on the student's perseverance.

<Table 1> shows the results of multiple regression analysis to verify the effect of classroom social environment on students' life satisfaction. As a result of the analysis, the regression model was explained by 40.8%, and the regression equation was found to be statistically significant(F=23.961, p<.001). By independent variable, emotional support of teachers(β=.269, p<.01), emotional support between students(β=.238, p<.01), and academic support between students(β=.187, p<.05) was found to have a statistically significant positive(+) effect on life satisfaction. Therefore, high emotional support from teachers, inter-student emotional support, and academic support among students in the classroom can also increase students' life satisfaction.

Multiple regression analysis was conducted to verify the effect of a student's grit on life satisfaction, and the regression model was described as 27.2% and the regression equation was statistically significant(F=39.821, p<.001). Passion(β=.530, p<.001) has a statistically significant positive effect on life satisfaction, so a higher passion among the grit also increases the student's satisfaction with life.

**Table 1.** Regression analysis of hypothesis 1, 2, 3 test(n=216).

| Dependents variable | Independents variable | Unst. coefficients | | St. coefficients | t | p | Multicollinearity | |
|---|---|---|---|---|---|---|---|---|
| | | B | SE. | β | | | Tolerance | VIF |
| Passion | (Constant) | 1.014 | .266 | | 3.818 | .000 | | |
| | SEC 1 | .150 | .075 | .166 | 2.005* | .046 | .437 | 2.287 |
| | SEC 2 | .013 | .071 | .015 | .184 | .854 | .442 | 2.260 |
| | SEC 3 | .082 | .069 | .089 | 1.196 | .233 | .542 | 1.844 |
| | SEC 4 | .172 | .066 | .188 | 2.583* | .010 | .568 | 1.761 |
| | SEC 5 | .203 | .074 | .221 | 2.750** | .006 | .464 | 2.153 |
| | SEC 6 | .090 | .067 | .105 | 1.331 | .185 | .484 | 2.065 |
| | $R^2$ =.374, Adj. $R^2$ =.356, F=20.809***, p=.000, Durbin-Watson=1.990 | | | | | | | |
| Perseverance | (Constant) | 2.781 | .363 | | 7.651 | .000 | | |
| | SEC 1 | .063 | .102 | .063 | .619 | .537 | .437 | 2.287 |
| | SEC 2 | .057 | .097 | .061 | .594 | .553 | .442 | 2.260 |
| | SEC 3 | -.139 | .094 | -.136 | -1.481 | .140 | .542 | 1.844 |
| | SEC 4 | -.007 | .091 | -.007 | -.078 | .938 | .568 | 1.761 |
| | SEC 5 | .230 | .101 | .227 | 2.282* | .024 | .464 | 2.153 |
| | SEC 6 | -.172 | .092 | -.182 | -1.866 | .063 | .484 | 2.065 |
| | $R^2$ =.038, Adj. $R^2$ =.010, F=1.377, p=.225, Durbin-Watson=1.911 | | | | | | | |
| | *p<.05, **p<.01, ***p<.001 | | | | | | | |
| Life satisfaction | (Constant) | .611 | .282 | | 2.167 | .031 | | |
| | Sec1 | .264 | .079 | .269 | 3.341** | .001 | .437 | 2.287 |
| | Sec2 | .018 | .075 | .019 | .243 | .809 | .442 | 2.260 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sec3 | -.054 | .073 | -.053 | -.737 | .462 | .542 | 1.844 |
| | Sec4 | .119 | .071 | .119 | 1.680 | .094 | .568 | 1.761 |
| | Sec5 | .238 | .078 | .238 | 3.044** | .003 | .464 | 2.153 |
| | Sec6 | .175 | .072 | .187 | 2.444* | .015 | .484 | 2.065 |
| | R² =.408, Adj. R² =.391, F=23.961***, p=.000, Durbin-Watson=1.982 | | | | | | | |
| | *p<.05, **p<.01, ***p<.001 | | | | | | | |
| Life satisfaction | (Constant) | 1.510 | .278 | | 5.430 | .000 | | |
| | Passion | .578 | .066 | .530 | 8.798*** | .000 | .942 | 1.061 |
| | Persever-ance | -.039 | .060 | -.040 | -.659 | .511 | .942 | 1.061 |
| | R² =.272, Adj. R² =.265, F=39.821***, p=.000, Durbin-Watson=2.056 | | | | | | | |
| | ***p<.001 | | | | | | | |

The results of analyzing the mediating effect of passion among grit on the relationship between the social environment of the classroom and students' life satisfaction are shown in <Table 2>.

**Table 2.** Three-step mediated regression analysis(grit-passion) of hypothesis 4 test(n=216).

| Category | Step | β | t | p | F | R² | Judgement |
|---|---|---|---|---|---|---|---|
| Emotional support of teachers | Step 1 | .495 | 8.333*** | .000 | 69.433*** | .245 | Partial mediation |
| | Step 2 | .526 | 9.046*** | .000 | 81.827*** | .277 | |
| | Step 3(Indt.) | .356 | 5.663*** | .000 | 61.508*** | .366 | |
| | Step 3(Med.) | .344 | 5.484*** | .000 | | | |
| Academic support of teachers | Step 1 | .450 | 7.363*** | .000 | 54.208*** | .202 | Partial mediation |
| | Step 2 | .451 | 7.395*** | .000 | 54.680*** | .204 | |
| | Step 3(Indt.) | .272 | 4.336*** | .000 | 52.410*** | .330 | |
| | Step 3(Med.) | .398 | 6.336*** | .000 | | | |
| Interaction promotion | Step 1 | .433 | 7.020*** | .000 | 49.280*** | .187 | Partial mediation |
| | Step 2 | .354 | 5.536*** | .000 | 30.647*** | .125 | |
| | Step 3(Indt.) | .159 | 2.477*** | .014 | 43.731*** | .291 | |
| | Step 3(Med.) | .452 | 7.059*** | .000 | | | |
| Facilitating mutual respect | Step 1 | .472 | 7.832*** | .000 | 61.346*** | .223 | Partial mediation |
| | Step 2 | .425 | 6.859*** | .000 | 47.044*** | .180 | |
| | Step 3(Indt.) | .230 | 3.571*** | .000 | 48.267*** | .312 | |
| | Step 3(Med.) | .412 | 6.384*** | .000 | | | |
| Emotional support between students | Step 1 | .499 | 8.427*** | .000 | 71.021*** | .249 | Partial mediation |
| | Step 2 | .539 | 9.364*** | .000 | 87.682*** | .291 | |
| | Step 3(Indt.) | .372 | 5.951*** | .000 | 63.804*** | .375 | |
| | Step 3(Med.) | .334 | 5.349*** | .000 | | | |
| Academic support between students | Step 1 | .456 | 7.499*** | .000 | 56.234*** | .208 | Partial mediation |
| | Step 2 | .522 | 8.942*** | .000 | 79.953*** | .272 | |
| | Step 3(Indt.) | .359 | 5.885*** | .000 | 63.265*** | .373 | |
| | Step 3(Med.) | .357 | 5.846*** | .000 | | | |
| | ***p<.001 | | | | | | |

The analysis found that the emotional support of teachers, academic support of teachers, interaction promotion, facilitating mutual respect, emotional support between students, and academic support between students had statistically significant positive effects on the parameter passion in phase 1, satisfying conditions for analysis of mediated effects(p<.001). As a result of the second stage mediating condition analysis, all sub-factors of the social environment of the classroom were found to have a statistically significant effect on the dependent variable, life satisfaction, thus satisfying the mediating conditions(p<.001). In the three-stage mediating condition, the regression coefficients of all sub-factors of the social environment of the classroom were significant and decreased compared to the second stage. Passion, which is a parameter, was also significant. Therefore, grit(passion) has a partial mediating effect in the relationship between two variables.

As a result of analyzing the mediating effect of grit(perseverance) on the relationship between the social environment of the classroom and the student's life satisfaction, it was found that the sub-factor of the social environment of the classroom did not have a statistically significant effect on the parameter, perseverance, in the first stage(p>.001). Therefore, in the relationship between two variables, perseverance does not meet the basic requirements for testing the mediating effect, so it is not necessary to test the mediating effect.

## 5. Conclusion

This study examines the effect of the social environment of the university classroom on the grit and life satisfaction of university students majoring in aviation service and the mediating effect of grit. As a result, the statistical significance of the relationship between the three study variables was confirmed, and it was confirmed that grit(passion) showed a partial mediating effect.

First, the social environment of the classroom had a significant effect on students' grit(passion). In detail, when "emotional support between students", "facilitating mutual respect" and "teacher's emotional support" increases, students' passion increases. In other words, the concept of emotional support is important. The professor builds trust in the professor by respecting students and making them feel belonging and expecting help whenever they need help. In order to achieve the long-term goal of becoming a cabin crew member of a highly competitive aircraft, students majoring in aviation services must continue to pay attention and efforts despite changes in external variables. However, the study was conducted at a time when aviation service students faced uncertainties in the aviation industry, including border closures and long term leave of aviation workers due to COVID-19. It is noteworthy that "emotional support between students", "facilitating mutual respect" and "teacher's emotional support" affect only the grit(passion) in which students want to achieve their long-term goals in this external variable situation. In other words, the study result that emotional support in the social environment of the class affects students' passion for achieving long-term goals is a result of reminding the role of teachers in the field of university education.

On the other hand, the social environment of the classroom was shown to have no significant impact on the student's grit(perseverance). Perseverance is the concept of steady effort, and aviation service majors make long-term efforts to pass the highly competitive cabin crew recruitment exam. However, it is inferred that the external variable, Covid-19, may have had an impact to some extent. Therefore, it is necessary to pay attention to the study results that teacher intimacy and trust have a significant effect on grit[21], and the study results of the antecedent variable of self-efficacy in the relationship between the social environment of the classroom and grit(perseverance)[22].

In other words, Professors in charge of education should not only transfer knowledge to students, but also build closeness and trust with students. In this way, students can make steady efforts to achieve their long-term goals in their school with respect and trust. In addition,

perseverance, which means long-term and steady effort, is the most important factor influencing self-efficacy, the belief that one can successfully accomplish one's own, rather than the positive energy, positive mind, or ability to control emotions[22]. Also, as shown in a study on the self-efficacy of cabin crew[23], and a study on the role of self-efficacy of nurses[24], the concept of self-efficacy is important in successfully performing their job. As seen in this previous study, it can be inferred that there may be mediating variables in the relationship between two variables. Therefore, further research is needed.

Second, the social environment of the classroom was found to have a significant effect on students' life satisfaction. This indicates the importance of professors, who are sub-factors of the social environment of the classroom, to provide cognitive and emotional support for students, to promote emotional and academic support between them, and to create an environment where students respect each other. This emotional support has been found to be a major factor that allows students to believe that they can do well on their own and have confidence in being able to achieve. In other words, fulfilling the original role of university education is one way to increase the life satisfaction of university students. Therefore, it is the way for universities to raise their competitiveness by cultivating future talents with a healthy satisfaction. Furthermore, due to the fourth industrial revolution and the prolonged COVID-19, future classrooms are changing to operate classes using non-face-to-face class teaching tools and various teaching methods[25]. Of course, such technological development and investment are important, but as can be seen from the results of this study, it is important for the university to create such an environment so that professors provide emotional support to students and students provide emotional and academic support to each other. In addition, in order to increase student satisfaction in the rapidly changing educational situation due to the 4th industrial revolution and COVID-19, multidisciplinary research at the university level is required[26].

Third, the higher the passion among grit, the higher the student's life satisfaction. Previous studies showed that grit had a significant effect on life satisfaction[15][27][28]. Grit plays a positive role in an individual's psychological health. Specifically, grit is related to the tendency to pursue happiness and the tendency to seek immersion[29]. Therefore, it was confirmed that having a passion for challenging a long-term goal under the belief that the aviation industry will recover to a normal situation after COVID-19 significantly affects the life satisfaction of students majoring aviation service. Therefore, if the university provides various programs so that the students can continue their persistence and passion through steady success experiences, the life satisfaction of university students majoring in aviation service can be maintained high.

It was found that grit(perseverance) did not significantly affect students' life satisfaction. It can be inferred that there may be a preceding variable between these two variables. Students majoring in aviation services need a steady process of effort to achieve long-term goals, in which they can think of the notion of resilience, such as resilience that comes back to its original place when experiencing various failures[30]. A follow-up study seeks to explore the relationship of resilience between perseverance and life satisfaction.

Fourth, passion among grit had a mediating effect between the social environment of the classroom and life satisfaction. To produce future talent satisfied with their lives, universities should provide an educational environment where students can maintain their passion for their goals based on various emotional support. Of course, due to the COVID-19, it is difficult to conduct face-to-face classes in the department of aviation services, which includes a lot of practical subjects in the curriculum. However, it is necessary for universities to provide various non-face-to-face programs related to their majors so that students can continue their perseverance and passion through steady success experiences. If the professor provides steady emotional support in the process, students will be able to maintain high life satisfaction.

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## 7. Appendix

### 7.1. Authors contribution

| | Initial name | Contribution |
| --- | --- | --- |
| Lead Author | SL | –Set of concepts ☑ <br> –Design ☑ <br> –Getting results ☑ <br> –Analysis ☑ <br> –Make a significant contribution to collection ☑ <br> –Final approval of the paper ☑ <br> –Corresponding ☑ |
| Corresponding Author* | SH | –Play a decisive role in modification ☑ <br> –Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑ <br> –Participants in Drafting and Revising Papers ☑ <br> –Someone who can explain all aspects of the paper ☑ |

# International Journal of Human & Disaster

## Effect of the Women's Beauty Care Behavior on the Psychological Happiness after COVID-19

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### Abstract

*Purpose: This study was conducted to articulate and specify as to how the women's beauty care behavior after COVID-19 influences their psychological Happiness. Towards this end, the beauty care behavior was set as an independent variable, and beauty interest, information search, beauty behavior, and appearance satisfaction were derived as the sub-factors, psychological Happiness variables were set as dependent variables, environmental control, personal growth, purpose of life, and positive interpersonal relationships were derived as the sub-factors.*

*Method: As for the research participants, they were collected and analyzed from among 231 online participants including freelancers, self-employed, workers, and students from related departments working in the beauty health industry in City S and Province G in Korea. For the analysis method, multiple regression analysis was performed to analyze the relationship between the participants' beauty care behavior and psychological Happiness, and the enter method was used to make entries.*

*Results: This study was conducted from this point of view to examine and understand how the women's beauty care behavior after COVID-19 will influence their psychological Happiness. Subsequent are the contents of the analytical results verifying the relationship of effect with the beauty care behavior variable, which has beauty interest, information search, beauty behavior, and appearance satisfaction as independent variables, and the psychological Happiness variable as dependent variables.*

*Conclusion: In this study, it was evident that new changes have taken in the beauty care behavior and psychological Happiness of the women participants after COVID-19, and in particular, it was confirmed that many changes have taken in the direct beauty behaviors. Based on the results of this study, a theoretical discussion of the beauty health was provided, and it is meaningful in that the information on the psychological health according to the beauty care behavior was provided.*

*[Keywords] COVID-19, Women's, Beauty Care, Behavior, Psychological Happiness*

## 1. Introductions

The standards of beauty in the modern society are constantly changing. An appropriate appearance management would help to maintain the smooth interpersonal relationships, and further, lead to a positive evaluation of an individual's ability to handle work, among crucial factors of expressing one's image and individuality of oneself in an extremely competitive society. The fact that various types of information may be easily searched and found due to the recent development of online platforms and the trend of increased use of the SNS has facilitated the interest in the appearance management[1][2][3].

Modern men are carrying out beauty care behaviors by choosing various management methods via a positive mindset that they could supplement their own flaws or complexes over their appearance and change their weaknesses into strengths, thereby stimulating the human desire to make up with a better appearance and inducing specific actions[4][5]. That is, they are making choices of various beauty behaviors as a means to express their own image and maintain a life in which beauty and health coexist, and recently create their own external image positively regardless of age, and furthermore, are utilizing it as a method to increase value of social life[6][7]. Hence, it may be said that many modern men are constantly carrying out effective beauty care behaviors to maintain their beauty in a healthy manner and create individual image of their personality.

Recently, the beauty care behavior in Korea has not been limited to women, but also the men's appearance management has also become even more diverse. Beauty care behavior is changing not only to satisfy one's own satisfaction, but also towards the cultural and social factors and the perception of other people's eyes. This means that even at a time when the social beauty standards are constantly changing and attempted, a proper appearance management leads to maintaining the smooth interpersonal relationships, professional positions, ability to work, and to the positive evaluation of individuals, and a good image may yield a trust to be able to win recognition in a intensely competitive society[8].

Such beauty behavior is a process in which individuals make self-presentation with a to express their own attractiveness in their mutual relationships with others in society. and it is also used as a positive means of overcoming the difference between an ideal appearance and one's negative appearance. such is a natural behavior of one's making efforts to manage appearance in terms of self and social standards[9][10]. Beauty care behavior is a sub-area of the appearance management which includes clothes, fashion, and one's own style, and means taking actions such as for skin, makeup, hair style, and body management to make up with attractive and individual appearance[11]. To maintain ideal appearances, modern men are continuing to carry out their beauty care behaviors holding their interest in the aesthetics.

As such, the aesthetic interest and the beauty care behavior, which are socio-cultural components, may be viewed as important variables which present the developmental potential of the beauty industry in the present time[9][11]. In particular, as the daily life of disasters, which have changed significantly from the previous lives due to COVID-19, continues, and our lives have been challenged largely across the economy, society and culture, and in a situation where the spread and decrease of infectious diseases are repeated, we are suffering from the psychological anxiety such as Corona blue and red[12][13].

In the COVID-19 situation, social distancing, distancing in daily life, hand washing, and wearing a mask, which are called physical vaccines, have become essential as life continues, and it appears that the part of interest in beauty is also beginning to change. As for the representative example, wearing a mask and covering most of the face to lead a daily life is yielding the women's increased preference for makeup focusing on the eyes and eyebrows, further leading to changes in their hair style and fashion[14][15]. Furthermore, as contactless has become a routine, the frequency of using online and SNS to acquire the beauty information has increased, which has a significant impact on the beauty industry[16].

This study was conducted to articulate and specify as to how the women's beauty care behavior after COVID-19 influences their psychological Happiness. Towards this end, the beauty care behavior was set as an independent variable, and beauty interest, information search, beauty behavior, and appearance satisfaction were derived as the sub-factors, psychological Happiness variables were set as dependent variables, environmental control, personal growth, purpose of life, and positive interpersonal relationships were derived as the sub-factors. Based on the results of this study, it will be possible to verify the women's interest in the beauty information, information search, and appearance satisfaction which have changed since COVID-19, and it will also be an opportunity to uncover and articulate the causal relationship between the beauty care behavior and the psychological Happiness through the social science.

## 2. Methods

### 2.1. Participant

As for the research participants, they were collected and analyzed from among 231 online participants including freelancers, self-employed, workers, and students from related departments working in the beauty health industry in City S and Province G in Korea. The sample group to be surveyed was sampled by using the judgmental sampling based on the non-probability sampling method, and the participants were all females. The questionnaire survey was conducted from March until April 2021, and 231 valid response sheets were collected from a sample group of 280 people and were used for the final analysis. The general characteristics of the survey respondents are as illustrated in <Table 1> below.

**Table 1.** General characteristics of participants.

| Division | Cases | Number of people | Percentage |
|---|---|---|---|
| Age | 20's | 39 | 16.9 |
| | 30's | 65 | 28.1 |
| | 40's | 71 | 30.7 |
| | 50's | 50 | 21.6 |
| | 60's | 6 | 2.6 |
| Marital status | Single | 74 | 32.0 |
| | Married | 133 | 57.6 |
| | Divorce or bereavement | 24 | 10.4 |
| Last educational background | Less than high school | 34 | 14.7 |
| | Less than college graduate | 136 | 58.9 |
| | Postgraduate or above | 61 | 26.4 |
| Job | Self-employment | 100 | 43.3 |
| | Freelancer | 46 | 19.9 |
| | Sales job | 23 | 10.0 |
| | Office worker | 42 | 18.2 |
| | Student | 20 | 8.7 |
| Amount required for beauty care | Less than 100,000 KRW | 91 | 39.4 |
| | Less than 200,000 KRW | 92 | 39.8 |
| | Less than 300,000 KRW | 27 | 11.7 |
| | Less than 500,000 KRW | 14 | 6.1 |
| | Less than 1,000,000 KRW | 7 | 3.0 |
| Sum | | 231 | 100 |

### 2.2. Instruments

To measure the beauty care behavior, the questionnaire contents of the previous studies related to the beauty interest and information search were modified and used[10]. The questionnaire was consisted of a total of 4 factors, and each question was consisted of 30 questions by using a 5-point Likert scale. Examining the results of the factor analysis performed on the women's beauty care behavior, the KMO measure and Bartlett's $X^2$ test performed for the model conformity analysis were analyzed to be 0.929 and 3986.929(p<.000), which turned out that the factor analysis model was conforming. The results of the Cronbach'α performed for the reliability analysis of each factor demonstrated that the level of interest was .859, information

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search .844, beauty behavior .874, and the appearance satisfaction was .868, yielding the good reliability.

In this study, the psychological Happiness scale(PWBS) was used as a measurement tool to examine the psychological Happiness, and the survey contents of the previous studies which studied jewelry therapy perception, appearance satisfaction, and happiness were referenced[17][18]. Examining the results of the factor analysis performed on the women's psychological Happiness, the KMO measure and Bartlett's $X^2$ test for model conformity were analyzed to be 0.893 and 3450.545(p<.000), yielding that the factor analysis model was conforming. According to the results of the Cronbach'α conducted for reliability analysis for each factor, it turned out that the environmental control was .701, personal growth .725, purpose of life .805, and the positive interpersonal relationship was .796, yielding the good reliability.

## 2.3. Data analysis

In this study, the final 231 copies of the questionnaires were collected and computerized after using the SPSS 21.0 statistical program. The specific analytical method is as follows. First, the exploratory factor analysis was performed to confirm the validity of the women's beauty care behavior and psychological Happiness scale after COVID-19, and the principal component analysis and Varimax rotation were used. As for the reliability verification, the Cronbach's α coefficient was calculated to verify the internal consistency between the questions. Second, the multiple regression analysis was performed to analyze the relationship between the participants' beauty care behavior and psychological Happiness, and the enter method was used to make entries. Third, the level of significance of statistical verification was determined at p<.05.

# 3. Results

## 3.1. Correlation analysis of measurement variables

**Table 2.** General characteristics of participants.

| | Division | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|
| | Interest | 1 | | | | | | | |
| Beauty care behavior | Information search | .858** | 1 | | | | | | |
| | Beauty behavior | .850** | .811** | 1 | | | | | |
| | Appearance satisfaction | .395** | .376** | .454** | 1 | | | | |
| Psychological happiness | Environmental control | .207** | .232** | .280** | .357** | 1 | | | |
| | Personal growth | .242** | .252** | .223** | .315** | .493** | 1 | | |
| | Purpose of life | .236** | .269** | .214** | .320** | .575** | .780** | 1 | |
| | Positive interpersonal relationships | .139* | .196** | .206** | .282** | .557** | .629** | .639** | 1 |

Note: **p<.01, *p<.05.

The results of the correlation analysis of the respondents' beauty care behavior variables and psychological Happiness variables for the women's beauty care behavior and psychological Happiness after COVID-19 demonstrated that the relationship between the sub-factors yielded a positive correlation. The analytical results are as illustrated in <Table 2> above, and it is evident

that the research direction is consistent as the relationship between each variable is demonstrated.

### 3.2. Analysis of the relationship between the beauty care behavior variables and the environmental control

The multiple regression analysis was performed to analyze the relationship between the factors of the women's beauty care behavior variables after COVID-19 and the environmental control factors among the factors of the psychological Happiness variables. The regression model was formed by using the environmental control factor as a dependent variable, and the results are as illustrated in <Table 3>. Examining the analytical results, the multiple regression model had an F value of 20.085 and a P value of .000(p<0.05), which was confirmed to be a statistically significant model. $R^2$, which demonstrates the explanatory power of the beauty care behavior variable for the environmental control, was .436, demonstrating that 43.6% of the total change was explained. The Durbin-Watson value was 1.909, demonstrating the fact that there was no auto-correlation of the error item. Examining the statistical significance of each independent variable, the interest factor($\beta$=.262, p=.024), information search factor($\beta$=.816, p=.016), and appearance satisfaction factor($\beta$=. 291, p=.000) turned out to be significant. The beauty behavior factors did not turn out to be statistically significant.

**Table 3.** Results of multiple regression analysis of beauty care behavior factors for environmental control.

| Dependent variable | Independent variable | B | SE | $\beta$ | t-value | Probability of significance |
|---|---|---|---|---|---|---|
| Environmental control | Constant | 2.523 | .173 | | 14.598 | .000 |
| | Interest | .229 | .069 | .262 | 3.304 | .024 |
| | Information search | .255 | .072 | .281 | 3.764 | .016 |
| | Beauty behavior | .145 | .081 | .225 | 1.793 | .074 |
| | Appearance satisfaction | .304 | .048 | .291 | 4.225 | .000 |

Note: F=20.085, $R^2$=.436, Durbin-Watson=1.909, p<0.05.

### 3.3. Analysis of the relationship between the beauty care behavior variables and the personal growth

The multiple regression analysis was conducted for the factors of the women's beauty care behavior variables and personal growth factors among the factors of psychological Happiness variables, and the results are as illustrated in <Table 4>. Examining the analytical results, the multiple regression model had an F value of 27.866 and a P value of .000(p<0.05), which was confirmed to be a statistically significant model. $R^2$, which demonstrates the explanatory power of the beauty care behavior variable for the personal growth, is .522, demonstrating that 52.2% of the total change is explained. The Durbin-Watson value was 1.850, demonstrating the fact that there was no auto-correlation of the error item. Examining the statistical significance of each independent variable, the information search factor($\beta$=.360, p=.0096) and the appearance satisfaction factor($\beta$=.466, p=.000) turned out to be significant for the personal growth dependent variable. The interest factor and the beauty behavior factor did not turn out to be statistically significant.

**Table 4.** Results of multiple regression analysis of beauty care behavior factors on personal growth.

| Dependent variable | Independent variable | B | SE | β | t-value | Probability of significance |
|---|---|---|---|---|---|---|
| | Constant | 2.458 | .208 | | 11.815 | .000 |
| | Interest | .068 | .119 | .081 | .572 | .568 |
| Personal growth | Information search | .309 | .187 | .360 | 3.259 | .009 |
| | Beauty behavior | -.074 | .097 | -.096 | -.755 | .451 |
| | Appearance satisfaction | .321 | .158 | .466 | 3.802 | .000 |

Note: F=27.866, $R^2$=.522, Durbin-Watson=1.850, p<0.05.

## 3.4. Analysis of the relationship of effect between the beauty care behavior variables and the purpose of life

The multiple regression analysis was performed for the factors of the women's beauty care behavior variables and the factors of psychological Happiness, and the results are as illustrated in <Table 5>. Examining the analytical results, the multiple regression model had an F value of 28.714 and a P value of .000(p<0.05), which was confirmed to be a statistically significant model. $R^2$, which demonstrates the explanatory power of the beauty care behavior variable for the purpose of life, was .534, demonstrating the fact that 53.4% of the total change is explained. The Durbin-Watson value was 1.954, demonstrating that there was no auto-correlation of the error item. Examining the statistical significance of each independent variable, the interest factor(β=.265, p=.012), information search factor(β=.230, p=.041), and appearance satisfaction factor(β=.277, p=.000) turned out to be significant. The beauty behavior factors did not turn out to be statistically significant.

**Table 5.** Results of multiple regression analysis of beauty care behavior factors for the purpose of life.

| Dependent variable | Independent variable | B | SE | β | t-value | Probability of significance |
|---|---|---|---|---|---|---|
| | Constant | 2.472 | .236 | | 10.458 | .000 |
| | Interest | .225 | .045 | .265 | 3.185 | .012 |
| Purpose of life | Information search | .202 | .098 | .230 | 3.052 | .041 |
| | Beauty behavior | -.126 | .111 | -.144 | -1.141 | .255 |
| | Appearance satisfaction | .264 | .066 | .277 | 3.987 | .000 |

Note: F=28.714, $R^2$=.534, Durbin-Watson=1.954, p<0.05.

## 3.5. Analysis of the relationship of effect between the beauty care behavior variables and the positive interpersonal relationships

The multiple regression analysis was performed for the positive interpersonal factors among the factors of the women's beauty care behavior variables and psychological Happiness variables, and the results are as illustrated in <Table 6>. Examining the analytical results, the multiple

regression model had an F value of 26.482 and a P value of .000(p<0.05), which was confirmed as a statistically significant model. $R^2$, which represents the explanatory power of the beauty care behavior variable for the purpose of life, was .503, demonstrating the fact that 50.3% of the total change was explained. The Durbin-Watson value was 1.820, demonstrating that there was no auto-correlation of the error item. Examining the statistical significance of each independent variable, the information search factor($\beta$=.207, p=.009) and the appearance satisfaction factor($\beta$=.239, p=.001) turned out to be significant for the environmental control dependent variable. The interest factor and the beauty behavior factor did not turn out to be statistically significant.

**Table 6.** Results of multiple regression analysis of beauty care behavior factors for positive interpersonal relationships.

| Dependent variable | Independent variable | B | SE | β | t-value | Probability of significance |
|---|---|---|---|---|---|---|
| Positive interpersonal relationships | Constant | 2.738 | .246 | | 11.127 | .000 |
| | Interest | -.259 | .140 | -.263 | -1.844 | .067 |
| | Information search | .235 | .102 | .207 | 3.307 | .009 |
| | Beauty behavior | .138 | .115 | .154 | 1.194 | .234 |
| | Appearance satisfaction | .262 | .069 | .239 | 3.675 | .001 |

Note: F=26.482, $R^2$=.503, Durbin-Watson=1.820, p<0.05.

## 3.6. Analysis of the relationship of effect between the beauty care behavior variables and the psychological happiness

The multiple regression analysis was performed to analyze the relationship between the factors of the women's beauty care behavior variables after COVID-19 for the overall psychological Happiness variables, and the results are as illustrated in <Table 7>. Examining the analytical results, the multiple regression model had an F value of 28.616 and a P value of .000(p<0.05), which was confirmed to be a statistically significant model. $R^2$, which demonstrates the explanatory power of beauty care behavior factors for psychological Happiness variables, was .517, demonstrating the fact that 51.7% of the total change was explained. The Durbin-Watson value was 1.837, demonstrating that there was no auto-correlation of the error item. Examining the statistical significance of each independent variable, the interest factor($\beta$=.209, p=.036), information search factor($\beta$=.296, p=.004), and appearance satisfaction factor($\beta$=.320, p=.000) turned out to be significant. The beauty behavior factors did not turn out to be statistically significant.

**Table 7.** Results of multiple regression analysis of beauty care behavior factors for psychological happiness.

| Dependent variable | Independent variable | B | SE | β | t-value | Probability of significance |
|---|---|---|---|---|---|---|
| Psychological happiness | Constant | 2.525 | .174 | | 14.532 | .000 |
| | Interest | .269 | .059 | .209 | 3.301 | .036 |
| | Information search | .222 | .072 | .296 | 3.684 | .004 |
| | Beauty behavior | .031 | .081 | .047 | .379 | .705 |

| | | | | | |
|---|---|---|---|---|---|
| Appearance satisfaction | .228 | .049 | .320 | 4.703 | .000 |

Note: F=28.616, R²=.517, Durbin-Watson=1.837, p<0.05.

## 4. Conclusion and Recommendations

The interest in appearance and beauty care behavior which has recently manifested in Korea is becoming even more diversified, and it is considered to be an important tool and a means to express oneself individually in the complex modern era[19][20]. Furthermore, in the modern society, where appearance itself has become a significant competitive edge as a way of expressing oneself as women's entry into the society has increased, changes according to the beauty care behavior are further expanding, which is also directly connected with consumption patterns. Such changes in the beauty care behavior in Korea have taken place because the interest in healthy beauty is growing following the improvement of quality of life such as the increased income, economic growth, and the greater life expectancy[21][22].

Hence, in this study, this study was conducted from this point of view to examine and understand how the women's beauty care behavior after COVID-19 will influence their psychological Happiness. Comprehensively examining such research results, significant results were derived from the interest factor, information search factor, and the appearance satisfaction factor, yet no statistical significance was discovered in the beauty behavior factor, which confirmed that there was a direct change in the beauty behavior after COVID-19. That is, the beauty behavior factor is understood to be so since, unlike the level of interest and information search, the direct product purchase behavior and the investment of time and money are carried out.

The modern society is creating a social atmosphere where the beauty is pursued in various manners in various directions, which leads to the individual competitiveness, and even men continuously make efforts to invest their time and money mentally, economically, and physically to carry out their beauty behaviors given their larger interest in the appearance management[10][23]. This leads to the various beauty behaviors to increase the satisfaction with appearance, and it is evident that it is for the better appearance management[21]. The beauty behavior is expressed differently depending on each individual's lifestyle and personality, such as social and cultural climates and influences, and the shape of clothes, and the individual creativity is also expressed as they become professionally specialized and further classified[24][25].

However, it has been inferred that the participants of this study have contracted and changed their direct beauty behaviors due to the contactless meetings, strengthened social distancing, and the routinization of the wearing of masks due to COVID-19. Social distancing and wearing a mask at all times are also called physical vaccines, and such non-pharmacological interventions are strongly regulated in the community[26]. Hence, it is determined that the direct beauty behaviors such as changing hairstyles, purchasing makeup products, and following the latest fashion styles have decreased, and the participants are satisfied with their appearance even with comfortable clothes and simple makeup by wearing their masks.

As such, in this study, it was evident that new changes have taken in the beauty care behavior and psychological Happiness of the women participants after COVID-19, and in particular, it was confirmed that many changes have taken in the direct beauty behaviors. Based on the results of this study, a theoretical discussion of the beauty health was provided, and it is meaningful in that the information on the psychological health according to the beauty care behavior was provided.

## 5. References

### 5.1. Journal articles

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## 6. Appendix

### 6.1. Authors contribution

| | Initial name | Contribution |
|---|---|---|
| Lead Author | IK | -Set of concepts ☑<br>-Design ☑<br>-Getting results ☑<br>-Analysis ☑ |
| Corresponding Author* | JL | -Make a significant contribution to collection ☑<br>-Final approval of the paper ☑<br>-Corresponding ☑ |
| Co-Author | HW<br>EK | -Play a decisive role in modification ☑<br>-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑<br>-Participants in Drafting and Revising Papers ☑<br>-Someone who can explain all aspects of the paper ☑ |