




## FEAR IN THE COVID-19 PANDEMIC AND ITS CORRELATES: A COMPARISON BETWEEN STUDENTS WITH SENSORY DISABILITIES AND WITHOUT IN BEIJING




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### ABSTRACT

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The fear among college students of different sensory status during the COVID-19 pandemic in Beijing was assessed with its correlates. The total sample of 686 cases was composed of students without sensory disabilities, students that are hard of hearing, and with a visual impairment. The measure of fear was adopted from an instrument assessing people's fear of flu published by WHO. The correlate variables beyond the demographics were all previously validated and documented tools. The students without sensory disabilities are more fearful than the students with sensory impairment. Females are more fearful than males. Social support reduces fear. Life satisfaction is negatively related to fear. While stress and anxiety increase fear, depression is negatively correlated with fear. Findings indicate that students with sensory disabilities are not the most fearful in a pandemic disaster like the current COVID-19, which may increase their risk of infection.

**Contribution/ Originality:** This study is one of the very few studies that have investigated the association between fear of the COVID-19 and its correlates among college students, especially the students with sensory disabilities. It revives an understanding that the students with sensory disabilities are not the most fearful in a pandemic disaster like the current COVID-19.

### 1. INTRODUCTION

December 2019 in Wuhan China, some flu and pneumonia like cases occurred, which was later named as novel coronavirus disease of 2019 (COVID-19). Without a knowledge of its origin, the disease broke out in China late in January and then February and March 2020. National Health Commission of the People's Republic of China announced that COVID-19 would be included in Class B infectious diseases and the prevention and control measures of Class A infectious diseases would be adopted (National Health Commission of the People's Republic of China, 2020). With the spread of COVID-19, as of January 25, Level 1 response to major public health emergencies

was launched in almost all the provinces, municipalities, and autonomous regions of China. Then on January 31, the World Health Organization (WHO) declared COVID-19 a public health emergency of international concern (WHO, 2020). Currently, novel coronavirus has spread worldwide, with over a staggering 2 million reported confirmed cases as of the middle of April 2020. At the time of writing, the number of confirmed cases is still rising rapidly.

Facing a sharp increase in the number of newly diagnosed patients and the uncertainty of the outcome of the disease, people are suffering from varying degrees of stress and fear. As large social groups, college students were concerned, campus classes were canceled, and all teaching activities were transferred to online format. As an important part of college student population, students with sensory disabilities (to include hearing and vision) were brought to our attention; their emotional response to the COVID-19 outbreak needs to be studied to protect this vulnerable group of college students. However, there has been no research on fear response by sensory disabled students in a crisis, not speaking of the COVID-19, a public health emergency of international concern. A study of the fear response and its related factors in college students with sensory disabilities in comparison with those without disabilities could help us better understand the mechanism of emotional response and provide tailored psychological support for these students.

Previous research indicates that people with disabilities are at higher risk of mental problems (Huurre & Aro, 1998; Zhou, Glasgow, & Du, 2019). For example, anxiety and depression symptoms are common mental health problems among people with disabilities (Baxter, Scott, Vos, & Whiteford, 2013). In developing countries, people with disabilities suffer from poor health, high rates of poverty, low levels of education and employment, poor independence, and limited ability to participate, all of which are detrimental to their mental health (Tian et al., 2016). Among individuals with disabilities, including college students with disabilities, their mental health status is worse than that of their non-disabled peers. In addition, people with disabilities are more likely than others to experience economic hardship and low social support, both of which are associated with poor mental health outcomes (Honey, Emerson, & Llewellyn, 2011).

The spread of the pandemic has affected many people, especially related to fear, and has become a social problem (Kasapoglu, 2017). Previous studies on the psychological effects of SARS, the H1N1 influenza pandemic focused on health care workers and patients (Matsuishi et al., 2012; Tam, Pang, Lam, & Chiu, 2004; Wu et al., 2009). Those studies showed that those who provided or received health care during these crises had significantly increased risk of developing a range of mental health problems, including anxiety, depression, fear, and stress (McBride et al., 2020). However, the level of fear that ordinary people face during a pandemic cannot be ignored. During the Ebola epidemic, for example, people's fearful behavior accelerated the spread of the Ebola virus and increased the risk of new psychological distress and mental illness (Shultz et al., 2016).

Suicide is a global phenomenon and occurs throughout the lifespan. Approximately 800,000 people die due to suicide every year, which is one person every 40 seconds (WHO, 2021). Suicide rates might be affected by this COVID-19 outbreak. Most of previous researches on suicide is limited to one area of possible risk factors, and few have been done on a combination of social and personal (psychological and spiritual) risk factors. Most studies are generally exploratory in nature from a medical perspective and therefore lack theoretical generalizations (Zhang, Wiczorek, Conwell, & Tu, 2011). In this study, we use a comprehensive and parsimonious theory, the Strain Theory of Suicide, explaining the socio-psychological mechanism prior to suicidal behavior (Zhang, 2019) to determine whether different levels of strain have different impact on fear in COVID-19. The Strain Theory of Suicide is a well-published theory that highlights the deeper sociological and psychological aspects of suicide and divides it into four dimensions based on the type of strain it causes on the individual: value strain, aspiration strain, relative deprivation strain, and coping strain (Lew et al., 2020). In the meantime, the strain theory of suicide (STS) is an emerging approach to look into the etiology of suicide beyond psychiatry, as well as genetics and/or epigenetics, although these non-social features are also often discussed as risk factors. Suicidal thoughts (ideation)

can be triggered by life events, which may create conflicts, frustration, psychological pain, hopelessness, and even desperation, and they can be called psychological strains (Zhang, 2019).

Enlightened by the notion of social comparison theories, the Social Reference Theory explaining and predicting social behavior has been conceptualized and developed (Zhang, 2019). The theory proposes that (1) any cognition must be understood in the context of a referent; (2) without a referent, there is no cognition; (3) changing a referent can change one's cognition; and (4) different parties have different referents on an issue because they have different referents (Zhao & Zhang, 2020). In terms of social behavior, the core meaning of referential theory is different references may lead to different feelings. For example, a person may have felt unhappy, but in this outbreak, many people were infected or even dead. Compared to these infected people, this person is actually happy to be alive. That is a different reference, so the feeling is different. Similarly, students with hearing and visual impairment have different life references than students without sensory disabilities, and they may have different levels of fear when facing COVID-19. According to the Social Reference Theory, change the reference can changing the cognition. In the meantime, a number of research projects have recently tested and found support for social reference theory and provided evidence for the Social Reference Theory with a focus on the third of the four propositions: changing the reference can change a person's perception (Zhao & Zhang, 2020). For instance, a research on self-rated well-being among Chinese students (Zhang, Zhao, Lester, & Zhou, 2014) found that Chinese students coming from urban areas, and thus from better-off families, were not necessarily more satisfied with their current life than students coming from the countryside, and thus from lower-income families. In other words, in symbolic interactionism, behavior—or behavior change—is a dependent variable, and perception is an independent variable, while in social reference analyses, perception becomes a dependent variable, and the type of reference is an independent variable (Zhang, 2013).

In this study, we aim to analyze the prevalence of fear in COVID-19 among Chinese college students and its associated factors. We also try to explore the differences in the level of fear in COVID-19 among different groups of college students.

## 2. METHOD

### 2.1. Participants

Data collection for this study was accomplished in Special Education College of a university in Beijing in the middle of March during the height of the COVID-19 pandemic. The online survey platform called “Questionnaire Star”, a commercial and professional survey agency in China was called in use. The call for participation, informed consent, and the QR code of questionnaire was forwarded to all students in the College through WeChat, a popular social media in China, to participate in the survey. The response rate was 93.72%.

The final sample contained 686 subjects aged 17–25 years, including 236 students without any disabilities and 450 students with sensory disabilities. Among students with disabilities, 307 reported from hearing loss, and 143 had visual challenges. Each of the 686 subjects responded to the online questionnaire either with a cellphone or a computer.

The survey was accomplished within one week starting from March 16, 2020. After the winter break in January of 2020, all colleges and schools in Beijing were closed and all classes had been moved to virtual classrooms. It was during the lockdown months in China due to the COVID-19 outbreak, and everyone across the country was confined at home. All travels, get-togethers, and out of door activities except for necessary grocery shopping or medical emergency were banned for people of China. When people had to leave apartments for errands, permissions were obtained from the neighborhood security officers and face masks were used. As of March 16, a total of 3,213 deaths and 80,860 confirmed cases had been reported in the whole country. Beijing had reported a total of 415 locally confirmed cases.

## 2.2. Instruments

The three sub-samples (students without sensory disabilities, students who are hard of hearing, and students who are visually impaired) answered the same questionnaire. Demographic information including gender, age, year in school, area of study, home-town (rural or urban), family income, self-perceived economic status, parent's education, living arrangement, as well as disability status were also collected.

Earlier established and well-validated scales were used in the data collection. Emotional Response Scale was adopted from a questionnaire survey assessing individuals' fear of deadly flu epidemic, published in a WHO website (Rubin et al., 2014). Psychological Strains Scale (PSS-40) was used to assess subject's trait psychological strains at the time of survey. The Chinese version of the Psychological Strain Scales (PSS-40) was previously validated (Zhang et al., 2014). Self-esteem was measured by Rosenberg Self-Esteem Scale (Stoodley, 1965). Social Support Survey was used to assess social support in four areas: emotional/informational support (eight items), tangible support (four items), affectionate support (three items), and positive social interaction (three items) (Rees et al., 2010). Depression, Anxiety and Stress Scale (DASS-21), is well-validated and highly cited psychological measure distinguishes between depression, anxiety and stress (Hogan, Phillips, Brumby, Williams, & Mercer-Grant, 2015). Suicidal ideation was adopted from the National Comorbidity Survey that included seven questions addressing the subjects' thoughts, plan, and attempt of suicide during the past year and lifetime (Kessler, Berglund, Borges, Nock, & Wang, 2005). We added one more question to the scale to estimate individuals' justification of someone else's suicide on a scale from 1 to 10, with 1 for least justified and 10 the most justified. Life satisfaction was measured by Satisfaction With Life Scale (SWLS) (Pavot & Diener, 1993). In this study, for the values in each scale, we have put them in some consistent order, with the larger the value, the higher for the variable named accordingly. For example, the higher value, the higher fear for the respondent.

## 2.3. Administration of the Survey

We imported the questionnaire to the Questionnaire Star. Since visually impaired students need special screen reading software to complete the questionnaire independently, we designed a separate questionnaire for them. To accommodate students who are visually impaired, a version of the questionnaire was developed to allow for use of screen reading software. All the questions in the two sets of questionnaires were the same. We did some pilot study for feasibility and appropriateness of the questionnaire firstly. After we checked the logicity of the questions and the content, we started the survey through the Questionnaire Star platform. All the students from School of Special Education were sampled consecutively. Finally, the raw data were exported from the Questionnaire Star.

## 2.4. Data Analyses

Statistical analyses were performed using SPSS 26. First, we used t-test, F test, and chi-square test to explore potential differences in fear and demographic variables among different groups of gender and sensory status. Second, we examined the comparison fear score among sensory challenged students and normal students through t-test and Pearson correlation. Then, we conducted multiple linear regression models to explore the association between sensory status (sensory disability or no sensory disability) and fear. Lastly, we built another regression model of fear of the COVID-19 on sensory status, demographics, and social psychological factors.

Table 1. Description of the samples with gender comparison and sample differences.

| Variable            | Students without Disabilities |              |                   |                         | Students that are Hard of Hearing |              |                   |                       | Students with a Visual Impairment |              |                   |                           | t/ X <sup>2</sup>         |
|---------------------|-------------------------------|--------------|-------------------|-------------------------|-----------------------------------|--------------|-------------------|-----------------------|-----------------------------------|--------------|-------------------|---------------------------|---------------------------|
|                     | f(%) or x̄(sd)                |              | t/ X <sup>2</sup> |                         | f(%) or x̄(sd)                    |              | t/ X <sup>2</sup> |                       | f(%) or x̄(sd)                    |              | t/ X <sup>2</sup> |                           |                           |
|                     | Total (n=236)                 | Male (n=54)  | Female (n=182)    |                         | Total (n=307)                     | Male (n=128) | Female (n=179)    |                       | Total (n=143)                     | Male (n=85)  | Female (n=58)     |                           |                           |
| Age                 | 20.32(1.87)                   | 20.69(1.86)  | 20.21(1.43)       | t=1.734*                | 22.10(1.74)                       | 22.04(1.86)  | 22.15(1.66)       | t=-0.554              | 21.48(1.81)                       | 21.43(1.91)  | 2.26(1.13)        | t=-0.508                  | F=74.642***               |
| Years in School     | 2.38(1.07)                    | 2.24(0.95)   | 2.42(1.10)        | t=-1.192                | 2.56(1.06)                        | 2.45(1.08)   | 2.63(1.04)        | t=-1.455*             | 2.12(1.17)                        | 2.02(1.19)   | 19(32.8)          | t=-1.186                  | F=8.017***                |
| Freshman=1          | 58(24.6)                      | 11(20.4)     | 47(25.8)          | X <sup>2</sup> =8.751** | 64(20.8)                          | 31(24.2)     | 33(18.4)          | X <sup>2</sup> =2.722 | 60(42.0)                          | 41(48.2)     | 17(29.3)          | X <sup>2</sup> =4.057     | X <sup>2</sup> =35.040*** |
| Sophomore=2         | 79(33.5)                      | 27(50.0)     | 52(28.6)          |                         | 78(25.4)                          | 35(27.3)     | 43(24.0)          |                       | 35(24.5)                          | 18(21.2)     | 10(17.2)          |                           |                           |
| Junior=3            | 50(21.2)                      | 8(14.8)      | 42(23.1)          |                         | 95(30.9)                          | 35(27.3)     | 60(33.5)          |                       | 19(13.3)                          | 9(10.6)      | 12(20.7)          |                           |                           |
| Senior and above=4  | 49(20.8)                      | 8(14.8)      | 41(22.5)          |                         | 70(22.8)                          | 27(21.1)     | 43(24.0)          |                       | 29(20.3)                          | 17(20.0)     | 2.26(1.13)        |                           |                           |
| Residence           |                               |              |                   |                         |                                   |              |                   |                       |                                   |              |                   |                           |                           |
| Rural=1             | 83(35.2)                      | 18(33.3)     | 65(35.7)          | X <sup>2</sup> =0.104   | 162(52.8)                         | 69(53.9)     | 93(52.0)          | X <sup>2</sup> =0.114 | 69(48.3)                          | 40(47.1)     | 29(50.0)          | X <sup>2</sup> =0.119     | X <sup>2</sup> =17.097*** |
| Urban=2             | 153(64.8)                     | 36(66.7)     | 117(64.3)         |                         | 145(47.2)                         | 59(46.1)     | 86(48.0)          |                       | 74(51.7)                          | 45(52.9)     | 29(50.0)          |                           |                           |
| Family Income       | 5.14(1.02)                    | 5.22(1.18)   | 5.12(0.97)        | t=0.642                 | 3.69(1.35)                        | 4.00(1.25)   | 3.47(1.38)        | t=3.427***            | 3.50(1.43)                        | 3.56(1.46)   | 3.40(1.39)        | t=0.690                   | F=112.413***              |
| Perc Econ Status    | 2.89(0.55)                    | 2.91(0.81)   | 2.88(0.45)        | t=0.199                 | 2.51(0.70)                        | 2.48(0.77)   | 2.53(0.64)        | t=-0.650              | 2.64(0.72)                        | 2.66(0.75)   | 2.62(0.67)        | t=0.312                   | F=22.806***               |
| Father Edu          | 2.74(1.08)                    | 3.15(1.22)   | 2.62(1.00)        | t=3.262***              | 2.16(0.88)                        | 2.20(0.93)   | 2.13(0.84)        | t=0.591               | 2.53(0.97)                        | 2.59(1.00)   | 2.45(0.94)        | t=0.846                   | F=24.545***               |
| Mother Edu          | 2.71(1.02)                    | 3.00(1.15)   | 2.63(0.97)        | t=2.173**               | 1.90(0.85)                        | 1.91(0.86)   | 1.88(0.85)        | t=0.317               | 2.30(1.08)                        | 2.26(1.16)   | 2.36(0.95)        | t=-0.563                  | F=48.239***               |
| Living with Parents |                               |              |                   |                         |                                   |              |                   |                       |                                   |              |                   |                           |                           |
| Living with=1       | 204(86.4)                     | 50(92.6)     | 154(84.6)         | X <sup>2</sup> =2.261*  | 261(85.0)                         | 109(85.2)    | 152(84.9)         | X <sup>2</sup> =0.003 | 128(89.5)                         | 76(89.4)     | 52(89.7)          | X <sup>2</sup> =0.002     | X <sup>2</sup> =1.681     |
| Not living with=2   | 32(13.6)                      | 4(7.4)       | 28(15.4)          |                         | 46(15.0)                          | 19(14.8)     | 27(15.1)          |                       | 15(10.5)                          | 9(10.6)      | 6(10.3)           |                           |                           |
| Self-Esteem         | 28.40(3.99)                   | 27.13(4.17)  | 28.77(3.87)       | t=-2.696***             | 25.52(3.20)                       | 25.76(3.17)  | 25.36(3.22)       | t=1.080               | 27.48(4.45)                       | 28.08(3.96)  | 26.60(4.99)       | t=1.971**                 | F=40.840***               |
| Social Support      | 63.37(12.50)                  | 59.91(14.55) | 64.40(11.67)      | t=-2.342**              | 56.81(10.87)                      | 55.31(10.26) | 57.88(11.19)      | t=-2.049**            | 58.81(11.63)                      | 59.33(11.92) | 58.05(11.26)      | t=0.644                   | F=21.630***               |
| Depression          | 6.89(9.04)                    | 10.81(11.22) | 5.73(7.96)        | t=3.110***              | 12.29(9.97)                       | 13.89(10.05) | 11.15(9.79)       | t=2.392***            | 8.18(7.76)                        | 8.99(7.75)   | 7.00(7.59)        | t=1.512*                  | F=24.932***               |
| Anxiety             | 7.78(8.68)                    | 10.52(10.53) | 6.97(7.91)        | t=2.293**               | 11.96(9.60)                       | 12.88(9.56)  | 11.31(9.60)       | t=1.414*              | 7.89(7.43)                        | 9.01(8.06)   | 6.24(6.10)        | t=2.336**                 | F=18.484***               |
| Stress              | 8.49(9.07)                    | 11.04(10.70) | 7.74(8.41)        | t=2.085**               | 13.47(9.35)                       | 14.41(9.38)  | 12.80(9.29)       | t=1.484*              | 10.29(7.92)                       | 11.51(8.04)  | 8.52(7.47)        | t=2.246**                 | F=21.295***               |
| Religion            | 6.41(3.44)                    | 7.00(4.86)   | 6.23(2.89)        | t=1.107                 | 6.81(3.90)                        | 6.92(4.21)   | 6.73(3.67)        | t=0.433               | 8.18(4.71)                        | 8.12(4.54)   | 8.28(4.99)        | t=-0.197                  | F=9.444***                |
| Life Satisfaction   | 23.75(6.09)                   | 22.52(7.31)  | 24.12(5.51)       | t=-1.491*               | 21.57(5.37)                       | 21.66(5.17)  | 21.51(5.53)       | t=0.228               | 21.17(5.32)                       | 21.11(5.05)  | 21.26(5.74)       | t=-0.168                  | F=13.513***               |
| Thinking of Suicide |                               |              |                   |                         |                                   |              |                   |                       |                                   |              |                   |                           |                           |
| Yes=1               | 36(15.3)                      | 8(14.8)      | 28(15.4)          | X <sup>2</sup> =0.010   | 71(23.1)                          | 28(21.9)     | 43(24.0)          | X <sup>2</sup> =0.194 | 22(15.4)                          | 8(9.4)       | 14(24.1)          | X <sup>2</sup> =5.7431*** | X <sup>2</sup> =6.800**   |
| No=2                | 200(84.7)                     | 46(85.2)     | 154(84.6)         |                         | 236(76.9)                         | 100(78.1)    | 136(76.0)         |                       | 121(84.6)                         | 77(90.6)     | 44(75.9)          |                           |                           |
| Strains             | 22.53(7.12)                   | 23.84(7.71)  | 22.15(6.90)       | t=1.540*                | 28.63(6.63)                       | 29.08(6.85)  | 28.31(6.47)       | t=1.003               | 23.89(5.99)                       | 24.02(6.23)  | 23.70(5.67)       | t=0.320                   | F=61.191***               |
| Fear Score          | 11.79(2.67)                   | 11.61(2.60)  | 11.84(2.70)       | t=-0.554                | 11.62(2.47)                       | 11.41(2.47)  | 11.77(2.47)       | t=-1.229              | 11.16(2.81)                       | 10.60(2.85)  | 11.98(2.54)       | t=-2.970***               | F=2.263*                  |

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 2. Fears of COVID-19: A comparison among students with sensory disabilities and students without sensory disabilities.

| Variable                       | without Disabilities Group (N=236)<br>t/r | Hard of Hearing Challenged (N=307)<br>t/r | Visual Impairment Challenged (N=143)<br>t/r |
|--------------------------------|---|---|---|
| Gender                         | t=-0.554                                  | t=-1.229                                  | t=-2.970***                                 |
| Age                            | r=-0.029                                  | r=0.135**                                 | r=0.042                                     |
| Residence (R=1, U=2)           | t=0.795                                   | t=0.496                                   | t=0.828                                     |
| Family Income                  | r=-0.029                                  | r=-0.056                                  | r=-0.125                                    |
| Perc Econ Status               | r=-0.080                                  | r=-0.041                                  | r=-0.069                                    |
| Self-Esteem                    | r=-0.125**                                | r=-0.059                                  | r=-0.077                                    |
| Social Support                 | r=-0.058*                                 | r=-0.085                                  | r=-0.185**                                  |
| Depression                     | r=0.102                                   | r=0.101*                                  | r=0.004                                     |
| Anxiety                        | r=0.155**                                 | r=0.140**                                 | r=0.020                                     |
| Stress                         | r=0.182***                                | r=0.139**                                 | r=0.056                                     |
| Religion                       | r=-0.068                                  | r=-0.005                                  | r=0.085                                     |
| Life Satisfaction              | r=-0.106*                                 | r=-0.191***                               | r=-0.143*                                   |
| Thinking of Suicide (Y=1, N=2) | t=1.060                                   | t=0.441                                   | t=0.780                                     |
| Strains                        | r=0.166**                                 | r=0.073                                   | r=0.043                                     |

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 3. Multiple regression of fear of COVID-19 on sensory disability status, demographics, and social psychological factors (N=686).

| Variable                         | Fear of COVID-19 |        |       |        |         |                  |
|----------------------------------|------------------|--------|-------|--------|---------|------------------|
|                                  | $\beta$          | r      | SE    | t      | p       | 95%CI            |
| Gender                           | 0.636            | 0.118  | 0.215 | 2.950  | p=0.003 | [0.213, 1.059]   |
| Age                              | 0.085            | 0.039  | 0.059 | 1.430  | p=0.153 | [-0.032, 0.201]  |
| Residence (Rural=1; Urban=2)     | -0.119           | -0.038 | 0.218 | -0.334 | p=0.584 | [-0.546, 0.308]  |
| Family Income                    | -0.019           | -0.025 | 0.092 | -0.734 | p=0.838 | [-0.199, 0.161]  |
| Perceived Economic Status        | -0.148           | -0.048 | 1.962 | 1.962  | p=0.370 | [-0.472, 0.176]  |
| Self-Esteem                      | 0.007            | -0.080 | 0.034 | 0.089  | p=0.835 | [-0.059, 0.073]  |
| Social Support                   | -0.016           | -0.085 | 0.010 | -2.230 | p=0.100 | [-0.034, 0.003]  |
| Depression                       | -0.167           | 0.078  | 0.025 | -3.014 | p=0.009 | [-0.117, -0.017] |
| Anxiety                          | 0.042            | 0.120  | 0.028 | 1.932  | p=0.100 | [-0.013, 0.098]  |
| Stress                           | 0.065            | 0.129  | 0.026 | 2.229  | p=0.014 | [0.013, 0.116]   |
| Religion                         | -0.020           | -0.015 | 0.026 | -2.092 | p=0.438 | [-0.070, 0.030]  |
| Life Satisfaction                | -0.062           | -0.132 | 0.020 | -2.030 | p=0.002 | [-0.101, -0.022] |
| Thinking of Suicide (Y=1, N=2)   | -0.089           | -0.048 | 0.268 | -0.055 | p=0.738 | [-0.615, 0.436]  |
| Strains                          | -0.009           | 0.092  | 0.020 | -0.476 | p=0.650 | [-0.049, 0.030]  |
| Sensory Status                   |                  |        |       |        |         |                  |
| Without Disabilities (reference) | 1                |        |       |        |         |                  |
| Hard of Hearing                  | -0.606           | 0.013  | 0.282 | -2.145 | p=0.032 | [-1.160, 0.051]  |
| Visual Impairment                | -0.789           | -0.083 | 0.323 | -2.441 | p=0.015 | [-1.423, -0.154] |
| Constant                         | 12.007           |        | 1.891 | 6.349  | p<0.01  | [8.293, 15.720]  |
| R <sup>2</sup>                   | 0.078            |        |       |        |         |                  |

### 3. FINDINGS

Table 1 illustrates the distribution (frequency and mean) of all the major variables under study with gender comparisons separately for the students without sensory disabilities, the students who are hard of hearing and the students who are visually impaired. In terms of demographic characteristics, it was found that among students without sensory disabilities, there were significant differences among different genders in age (p=0.087), grade (p=0.033), parents' education level (p=0.001; p=0.033), and whether or not living with their parents (p=0.10). However, their family income, perceived economic status, and religious beliefs were not statistically significant for gender. Among the students who are hard of hearing, only their grade (p=0.10) and family income (p=0.001) showed a significant difference between males and females. However, there was no statistical significance among students who are visually impaired.



Table 1 shows the gender difference in the students without sensory disabilities, in which there was significant difference for self-esteem ( $p=0.008$ ), social support ( $p=0.02$ ), depression ( $p=0.003$ ), anxiety ( $p=0.025$ ), stress ( $p=0.041$ ), life satisfaction ( $p=0.10$ ), strains ( $p=0.10$ ), mother education levels ( $p=0.03$ ), father education levels ( $p=0.004$ ), living with parents ( $p=0.10$ ), but there was no statistical significance on region, regarding suicide and fear. The students who are hard of hearing had significant differences in social support ( $p=0.041$ ), depression ( $p=0.017$ ), anxiety ( $p=0.1$ ), stress ( $p=0.10$ ), but no significant differences in other aspects. There were significant differences among students who are visually impaired in self-esteem ( $p=0.05$ ), depression ( $p=0.1$ ), anxiety ( $p=0.021$ ), stress ( $p=0.026$ ), thinking of suicide ( $p=0.01$ ) and fear ( $p=0.003$ ). For the majority of information in the comparison between the three groups was statistically significant. In other words, for different groups of students, there were differences in the self-esteem ( $F=40.84$ ,  $p<0.01$ ), social support ( $F=21.630$ ,  $p<0.01$ ), depression ( $F=24.932$ ,  $p<0.01$ ), anxiety ( $F=18.484$ ,  $p<0.01$ ) and stress ( $F=21.295$ ,  $p<0.01$ ), as well as their life satisfaction ( $F=13.513$ ,  $p<0.01$ ) and fears ( $F=2.263$ ,  $p<0.1$ ) of COVID-19.

Table 2 shows the correlations between the fears scores of COVID-19 and major variables under study separately for each of the three different groups: the students without sensory disabilities, the students who are hard of hearing and the students who are visually impaired. For the students without sensory disabilities and students with hearing impairment, we can know that there were significant correlations between fear and anxiety, stress, life satisfaction. Among these students, life satisfaction ( $p=0.10$ ;  $p=0.001$ ) reduced their fear level, anxiety ( $p=0.017$ ;  $p=0.014$ ), stress ( $p=0.005$ ;  $p=0.015$ ) increased their fear. And the fear of COVID-19 among the students who are visually impaired was significantly different in gender ( $p=0.003$ ) and negatively correlated with social support ( $p=0.027$ ) and life satisfaction ( $p=0.010$ ). Interestingly, in the students with sensory disabilities, there was significant correlation between demographic variables and fear. For students with hearing impairment, their fear scores positively correlated with age ( $p=0.018$ ). The fear scores of females in the students who are visually impaired were significantly higher than males ( $p=0.003$ ). However, the fear of COVID-19 in the three groups was not statistically significant between different residence, family income, and self-perceived economic status. The correlation between strains and fear in three groups revealed that higher level strain can increase the level of fear of COVID-19, though only the students without sensory disabilities are significant. The relationship between depressive symptoms was reversed ( $r=0.102$ ;  $r=0.101$ ;  $r=0.004$ ), but only the students who are hard of hearing are statistically significant. So, we need to use the multiple linear regression model to confirm their relationships accurately.

One major purpose of the study is to distinguish the fear level of the three groups of college students during the COVID-19 pandemic and their correlates. More definite correlations can be found in the multiple regression analyses with all relevant variables put in the same analytic scheme, in which all factors are controlled for. All three groups were included in the model as the major independent variable, that was, different sensory status.

Shown in Table 3, after controlling for other variables, there was still a significant difference between females and males when it came to the fear of the COVID-19, with females are more fearful than males ( $\beta=0.636$ ;  $p=0.003$ ). Their social support ( $\beta=-0.016$ ;  $p=0.100$ ), depression ( $\beta=-0.167$ ;  $p=0.009$ ), life satisfaction ( $\beta=-0.062$ ;  $p=0.002$ ) were negatively correlated with fear of the COVID-19 and statistically significant. Their anxiety ( $\beta=0.042$ ;  $p=0.100$ ) and stress ( $\beta=0.065$ ;  $p=0.014$ ) were positively correlated with fear of the COVID-19. That was, social support, life satisfaction and depression reduced the fear while stress and anxiety increased the fear. This also confirmed the analysis results in Table 2. In addition, the students without sensory disabilities were more fearful of the pandemic than the students who are hard of hearing ( $\beta=-0.606$ ;  $p=0.032$ ) and the students who are visually impaired ( $\beta=-0.789$ ;  $p=0.015$ ). This suggested that, in general, what we thought of as students with sensory disabilities were not the most fearful in a pandemic disaster like the current COVID-19, which might be related to the different levels of reference selected by different groups. These results were consistent with the previous analysis. The explanatory power of the model was 0.078, which was feasible.

#### 4. DISCUSSION

During the COVID-19 pandemic lockdown period, generally, females responded with more fear than males. Students with social support, or being satisfied with life are less likely to be scared. Students with anxiety and stress tend to score high on the fear response, but students with depression are less likely to be fearful of the pandemic. This study confirms that students without sensory disabilities, students who are hard of hearing and students who are visually impaired have different levels of fear when they face the COVID-19 crisis. In comparison with students without sensory disabilities without a disability, college students with disabilities are less fearful in the dark times, and the students who are visually impaired are less scared than the students who are hard of hearing.

The world has been greatly affected by COVID-19 and the pace of life has been disrupted. Adding to this can be other issues, such as unemployment and family life disturbance. Facing a life crisis, some students are less able than others to cope and they may experience various psychological strains. When individuals are incapable of dealing with these pressures or stress in daily life, they may have some psychological problems or even suicide intentions. Females or students with economic advantages are more sensitive and vulnerable in the crisis of COVID-19. However, social support is a necessary factor to reduce strain and the possibility of suicide (Lew et al., 2020). Those students who receive or perceive enough social support, exemplified in religious community or family, may be able to cope with the strains well. Welfare, faith, and happiness are positive powers against fear.

With different social and sensory capacities, students with disabilities are more strained than their counterparts without disabilities (Table 1). Also, the level of strain increases the degree of fear for students without sensory disabilities (Table 2), although the relationship disappears in the multiple regression model where the sensory status is controlled (Table 3). As predicted by the Strain Theory of Suicide, those students with a visual impairment and students who are hard of hearing are at a higher risk of suicide than other students.

College students with some degree of depressive symptoms may not be fearful of the COVID-19 breakout as much as students who are not depressed. Depression can be a negative mentality in which the world is damaged, and further damage to the world does not impact the depressed individual as much as it is to mentally healthy people. Because depression has an impact on the affective and cognitive reactivity of individuals (Guhn, Sterzer, Haack, & Köhler, 2018). Negative emotions with high motivational intensity allow for faster reallocation of attention facilitating detection of potential threats/rewards in one's environment (Storbeck, Dayboch, & Wylie, 2019). Thus, the depressed and the non-depressed people must have some different references to perceive the deadly pandemic. The Social Reference Theory accounts for this observation.

The Social Reference Theory is a cognitive perspective for people to know and define the social world. Only with reference can people have perception, which means people's perception of things and understanding of the world are various according to different references. Social reference theory can be used as a mechanism of various psychological states, such as life satisfaction (Zhang et al., 2014), attractiveness judgment (Zhao & Zhang, 2020), as well as depression, suicidal ideation and psychological strains (Zhang, Liu, & Sun, 2017; Zhao & Zhang, 2018).

In this study, the Social Reference Theory has its explanatory power. A core explanation from the Theory is that the perceived fear varies among students with sensory disabled and psychological characteristics because they must have different references. People living in different environments and backgrounds have different references in mind for the same objects, and that is why they perceive the same objects differently (Zhang, 2009). Students with depression and students without depression live indifferently defined environments and see the social world with a different reference, and therefore perceived the life-threatening crisis differently. For people who are not depressed, life is beautiful, and any negativity is a loss; for people with depression, the world is already a mess and an additional crisis is not a big deal. Further, people perceive, judge, and evaluate social facts according to their reference and their responses must be based on their performance. While the Symbolic Interactionism argues that symbolic perception determines how people interact and explains why people respond differently to a same social fact (Blumer, 1969), the Social Reference Theory tells us how the different perception is formed (Zhang, 2013).



It is noted that college students with sensory disabilities are less fearful during a pandemic, and the students who are visually impaired are less scared than the students who are hard of hearing. With the same argument, this can be explained by the Social Reference Theory. Life of the students without a disability can be normal and stable, and when the life balance is affected by COVID-19, they become alert and fearful. On the other hand, students with disabilities may live in a disadvantaged environment (Martins, Faísca, Vieira, & Gonçalves, 2019) They may have a different reference than other students when they evaluate the danger degrees of the COVID-19. For students with visual impairment, they may have seen the crisis less than the students that are hard of hearing and students without sensory disabilities (Lissitsa & Madar, 2018). Their reference to the COVID-19 is also different from that of the students who are hard of hearing. Therefore, students who are visually impaired are more fearful of the deadly crisis than their hearing counterparts.

Another explanation for the a decrease in fear reported students with visual and students who are hard of hearing maybe that the disabled senses prevent them from perceiving the deadly crisis as much in details, and they may not know the severity of the problem as other people do (Martins et al., 2019). In this sample, they may not be able to see or hear as much as other people do and may have perceived the crisis as less serious as people who can see and hear things directly and clearly. However, we did not have a measure in the study to know if students of the three groups have the same level of knowledge on the severity of the crisis.

In sum, individuals' reference determines their perception, and their perception leads to their emotional response. Students with either depressive symptoms or sensory disabilities perceive the COVID-19 crisis with their early built references which other students do not have, and that is why they may respond to the deadly pandemic with different levels of fear.

Findings from the data indicate that sensory disadvantaged people are not the most fearful in a pandemic disaster like the current COVID-19, which may increase their risk of infection. The degree of fear may indicate the perceived importance level of the COVID-19 crisis among people. Emotional response of fear may stimulate people adopting more protection measures to fight the disease. During the global outbreak of COVID-19, increasingly more attention should be paid to the sensory disadvantaged students. While explanations of the findings are made with the Social Reference Theory, extra protections may be considered by policymakers for the sensory disadvantaged individuals. These findings can help governments and schools to better understand the psychological state of disadvantaged groups and take measures to effectively assist different groups of students in China as well as the rest of the world.

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