



# Effect of Attitude Toward Suicide on Suicidal Behavior: Based on the Korea National Suicide Survey

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**Objective** Suicide is a complex phenomenon; therefore, it should be approached in light of sociocultural perspectives and the general attitude toward suicide. This study aimed to extract factors from the Attitude Toward Suicide Scale (ATTS) and investigate the relationship between attitudes toward suicide and suicidal behavior (i.e., suicidal idea, plan, and attempt) by using a representative sample of Korean adults.

**Methods** Three thousand Koreans aged 19 to 75 years were surveyed cross-sectionally in 2013 and 2018. The data collected were subjected to exploratory factor analysis. Extracted attitude factors were compared using a suicidal behavior continuum. Univariate and multivariate logistic models were constructed to compare the association between attitude factors and suicidal behaviors.

**Results** Among the participants, 477 (15.9%) experienced suicidal idea only, 85 (2.8%) had a suicidal plan without attempt, and 58 (1.9%) attempted suicide. Four meaningful factors were extracted from the factor analysis: “permissiveness,” “unjustified behavior,” “preventability/readiness to help,” and “loneliness.” “Permissiveness,” “unjustified behavior,” and “loneliness” factors showed significant trends across the suicidal behavior continuum. Permissive attitude toward suicide increased the odds of suicidal idea, suicidal plan, and suicide attempt (adjusted odds ratio [aOR]=1.49, 95% confidence interval [CI]=1.25–1.79; aOR=2.79, 95% CI=1.84–4.25; aOR=2.67, 95% CI=1.65–4.33), while attitude toward suicide as unjustified behavior decreased the odds of suicidal ideation and attempt (aOR=0.79, 95% CI=0.67–0.94; aOR=0.64, 95% CI=0.42–0.99).

**Conclusion** A significant association was found between attitude toward suicide and suicidal behaviors. Attitude toward suicide is a modifiable factor that can be used to develop prevention policies.

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**Keywords** Suicidal ideation; Suicide; Attitude.

## INTRODUCTION

Suicide is a major public health concern worldwide. According to the Organization for Economic Cooperation and Development (OECD) report in 2017, the average suicide rate of OECD countries was 12.1 per 100,000.<sup>1</sup> Suicide is not just a personal problem affecting individuals, but a social phenomenon that incurs a large social cost.<sup>2-4</sup> Hence, many countries have implemented national suicide prevention plans and made

efforts to investigate the major risk factors of suicide.<sup>5,6</sup>

Suicide is not a momentary reaction but a complex phenomenon that starts from a suicidal idea with many factors accumulating in stages.<sup>7</sup> Personal factors such as psychiatric disorders and socio-cultural factors lead to this irreversible outcome.<sup>8,9</sup> The society's perspective influences the prevalence of suicidal behavior in the society. The more permissive the attitude of a person or society, the more frequent the suicidal behaviors.<sup>10-12</sup> Attitudes determine behavior, and behaviors reinforce attitudes in turn; therefore, it is important to understand the attitude toward suicide to prevent suicides. However, the degree of association between attitude toward suicide and suicidal behaviors is influenced by multiple socio-cultural factors, such as sex, age, socio-cultural backgrounds, suicide attempt of a close one, and one's own history of suicidal behaviors, thus increasing the complexity of the phenomenon.<sup>13-16</sup>

To clarify the complex intertwined relationship between pub-

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lic perspective on suicide and suicidal behavior and measure the attitude toward suicide, a valid and reliable instrument is needed along with a representative sample. Many previous studies tried to validate the Attitude Toward Suicide Scale (ATTS), developed by Renberg and Jacobsson,<sup>17</sup> but with small sample sizes from populations limited in terms of age, occupation, or region, without comprehensively evaluating suicidal behaviors.<sup>18,19</sup> One previous study tried to investigate the factor structure of attitude toward suicide using data from the 2013 Korean National Suicide Survey;<sup>20</sup> however, the study was not able to comprehensively analyze the association between attitude factors and suicidal behavior due to the small number of participants who experienced suicidal behaviors.

To date, no study has confirmed the association between attitude toward suicide and suicidal behaviors in a large representative sample. The aim of this study was to extract valid attitude factors using the ATTS in a large representative sample from the Korean population and to explore whether those factors of ATTS are related to suicidal behaviors.

## METHODS

### Subjects

The current study used data from the Korean National Suicide Survey, a cross-sectional national representative survey conducted once every 5 years by the Ministry of Health and Welfare of South Korea.<sup>21</sup> Stratified regional samples of Korean adults aged 19 to 75 years were collected from the years 2013 and 2018 in order to construct a representative sample of South Korea. A total of 150 districts were extracted at Statistics Korea, nationwide based on the housing census reports of 2010 and 2016. From each district, 10 households were randomly selected, and a member of the household was requested to participate in the survey. If a selected participant refused to participate in the survey or were not able to meet the investigators for four visit times, he/she was replaced by another participant. A total of 3,000 people, 1,500 participants each year, were surveyed using face-to-face structured interviews, using standardized questionnaires, conducted by trained interviewers. A small token gift amounting to approximately 3,000 Korean Won was given for answering the questionnaire.

Interviewers must complete survey-related education based on a consistent survey guideline and maintain quality control through continuous contact with supervisors. They were able to contact the research supervisors if any questions arose during the survey process. All statistical sampling and weighting procedures for the survey were the same for both 2013 and 2018 to achieve comparability.

The 2013 and 2018 surveys were approved by the Kangwon National University Hospital's Institutional Review Board

(approval number: KNUH-2013-06-007-001) and Seoul National University Hospital's Institutional Review Board (approval number: H-1810-062-979), respectively.

### Measurements

To examine participants' attitudes toward suicide, the ATTS first developed and validated by Renberg<sup>17</sup> was used. At the time of the 2013 survey, a modified 40-item version of ATTS was received via email and translated into Korean in 2011. It was back-translated by a Korean-American psychologist. The final Korean version of the scale was confirmed by psychiatrists and suicide prevention program practitioners.<sup>22</sup> Three optional items were excluded, and the remaining 37 items were used in the study; a 5-point Likert scale (1=do not agree at all, 2=do not agree, 3=doubtful, 4=agree to a large extent, and 5=agree completely) was used for scoring the items. ATTS contains appropriate number of items suitable for large-scale surveys and is widely used in studies on suicide attitudes in Europe and Asia.<sup>23</sup>

In addition to the ATTS responses, socio-demographic factors including age, sex, marital status, urbanicity, education level, income, employment, and religion were investigated. Subjective happiness and physical health status, history of suicide exposure, attitude on the suicide shown on the media, and agreement on suicide prevention and on current suicide prevention management programs were comprehensively investigated.

In order to minimize the resistance of the respondent, questions about happiness and physical/mental health status, which can be answered more easily, were placed in the beginning, followed by questions on suicidal behaviors, asked in the order of suicidal ideation, suicide plan, and attempt. All questions were structured with clear guidelines. A more detailed explanation of the survey process can be found in the Statistical information report of Korea National Suicide Survey (KNSS).<sup>24</sup>

### Statistical analysis

Group comparisons of sociodemographic characteristics among participants with and without suicidal behaviors (i.e., ideation, plan, and attempt) were carried out using the  $\chi^2$  test. Cronbach's  $\alpha$  was used to assess the internal reliability of ATTS. Items of communality score under 0.4 and items that increase  $\alpha$  when removed were discarded. Exploratory factor analysis was performed to extract factors using the principal factor method with a varimax rotation. Items with loadings  $<0.4$  and those with loadings  $>0.4$  for two or more factors were discarded. For each factor, Cronbach's  $\alpha$  was calculated. Item scores were averaged to obtain subscale attitude factor scores. Items with negative loadings were scored in reverse order when averaged.

One-way analysis of variance was performed to compare the attitude factor scores among the suicidal continuum groups.

The Bonferroni method was used for multiple comparisons. Trend analysis using Jonckheere-Terpstra test was performed to examine whether a factor score had an increasing or decreasing trend with statistical significance across the suicidal continuum.

Logistic regression analyses were performed to identify the association between each attitude factor's score and the suicidal behavior (i.e. ideation, plan, and attempt). Odds ratios (ORs) and 95% confidence intervals (95% CIs) of each suicidal behavior group were calculated with no suicidal idea group as the reference group. Age, sex, marital status, education, income, and religion were adjusted in the multivariate model. All data analyses were performed using SPSS version 23.0 (IBM Corp., Armonk, NY, USA).

## RESULTS

### Sociodemographic characteristics

Sociodemographic characteristics of the participants are presented in Table 1. Among 3,000 participants, 620 (20.7%) had a history of suicidal behavior; 477 (15.9%) had suicidal idea only, 85 (2.8%) had a suicidal plan without attempt, and 58 (1.9%) had attempted suicide in life. The proportions of marital status, education level, monthly income, and religion were significantly different among the suicidal continuum groups.

### Factor analysis of ATTS

The average scores and standard deviation for each ATTS item are shown in Supplementary Table 1 (in the online-only Data Supplement). The Kaiser-Meyer-Olkin score was 0.821, and Bartlett's sphericity test resulted in significant probability less than 0.001, confirming that the sample was suitable for exploratory factor analysis. After excluding items with low communality score and low factor loadings, 29 items were analyzed. The variance explained by each factor was 3.88%–10.47%, and the sum of the variances explained in the five factor axes was 51.9%. Exploratory factor analyses revealed the following nine interpretable factors: 1) "permissiveness"; 2) "unjustified behavior"; 3) "call for help"; 4) "preventability/readiness to help"; 5) "loneliness"; 6) "reasons for suicide"; 7) "incomprehensibility"; 8) "unreliable"; 9) and "nonreversible." The factor loadings for all items and Cronbach's  $\alpha$  for all factors are depicted in Table 2. We regarded the attitude factors that had Cronbach's  $\alpha > 0.4$  as meaningful.

### ATTS factors affecting suicidal behavior

The group comparisons of mean attitude factors are depicted in Table 3. A significant difference in "permissiveness," "unjustified behavior," and "loneliness" factors among the groups was observed. The suicidal continuum of ideation, plan, and

attempt along the factors of "permissiveness" and "loneliness" were increased significantly. "Unjustified behavior" showed a significant decreasing trend.

The univariate and multivariate models are depicted in Table 4. "Permissiveness" predicted suicidal ideation, plan, and attempt in both univariate (OR=1.60, 95% CI=1.35–1.89; OR=2.60, 95% CI=1.18–3.79; OR=3.42, 95% CI=2.17–5.38, respectively) and multivariate models (adjusted odds ratio [aOR]=1.49, 95% CI=1.25–1.79; aOR=2.79, 95% CI=1.84–4.25; aOR=2.67, 95% CI=1.65–4.33, respectively). "Unjustified behavior" decreased the odds of suicidal idea and suicide attempt in both univariate (OR=0.78, 95% CI=0.67–0.91; OR=0.68, 95% CI=0.46–1.00, respectively) and multivariate models (aOR=0.79, 95% CI=0.67–0.94; aOR=0.64, 95% CI=0.42–0.99, respectively). "Loneliness" increased the odds only in suicide attempt group in both univariate (OR=1.93, 95% CI=1.37–2.71) and multivariate models (aOR=1.50, 95% CI=1.03–2.20).

## DISCUSSION

The main objective of this study was to extract meaningful factors from the ATTS to investigate the relationship between attitude scales and suicidal behavior. Among nine factors, "permissiveness," "unjustified behavior," "preventability/readiness to help," and "loneliness" factors were found to be meaningful. There were significant group differences and meaningful trends of factors along the suicidal behavior continuum of idea-plan-attempt. Furthermore, those factors showed a strong association with suicidal behaviors when the analysis models were adjusted for confounders.

The lifetime prevalence rates of suicidal idea, plan, and attempt found in the current study were similar to those in previous studies in South Korea; however, the proportion of people who attempted suicide (1.9%) found in our study seemed to be lower than the estimated numbers in previous studies (2.4%–3.2%).<sup>25–28</sup> The estimation of lifetime prevalence of suicidality differs according to the sampling process, surveying methods, and year and place of study. Asking people about their attitude toward suicide may have prompted them to conceal their suicide experiences since the scale itself contains wordings such as "Suicide can never be justified," which could intimidate participants and prevent them from being frank. For stigmatized populations such as suicide attempters, different strategies may be needed in terms of the wording of the questionnaires and sampling processes to reflect reality.<sup>29</sup>

The overall factor structure of the study yielded similar results as those of previous studies; nine factors were comparable with Renberg's study,<sup>17</sup> but individual items varied considering the different cultures of Sweden and South Korea.<sup>15</sup> Further, Renberg's "suicide as a right" and "resignation" factors

were merged as one into the “permissiveness” subscale. The “unjustified behavior” subscale contained three overlapping items as opposed to four items in Renberg’s “incomprehensibility,” implying negative and oppositional attitude toward suicide. Considering the fact that a negative attitude toward suicide has the greatest influence on the stigma related to suicide, the current subscale may be applied broadly to assess the population’s attitude and degree of stigma.<sup>30,31</sup> The “loneliness” sub-

scale was extracted as a separate scale in this study, and the factor analysis yielded different results from those reported in studies from other countries.<sup>17,23,32</sup> Future studies are needed to investigate the applicability of this scale in other cultures as well.

The results of the current study are consistent with those of previous studies, implying an association between permissive attitude toward suicide and suicidal behaviors in various study

**Table 1.** Sociodemographic factors among no suicidal idea group, suicidal idea only, suicidal plan, and suicidal attempt group

|                              | No suicidal idea<br>(N=2,380) (79.3%) | Suicide behavior (N=620) (20.7%)      |                                |                                  | p-value |
|------------------------------|---------------------------------------|---------------------------------------|--------------------------------|----------------------------------|---------|
|                              |                                       | Suicidal idea only<br>(N=477) (15.9%) | Suicidal plan<br>(N=85) (2.8%) | Suicide attempt<br>(N=58) (1.9%) |         |
| Sex                          |                                       |                                       |                                |                                  | 0.430   |
| Male                         | 1,151 (48.4)                          | 216 (45.3)                            | 38 (44.7)                      | 24 (41.4)                        |         |
| Female                       | 1,229 (51.6)                          | 261 (54.7)                            | 47 (55.3)                      | 34 (58.6)                        |         |
| Age (yr)                     |                                       |                                       |                                |                                  | 0.375   |
| 19–29                        | 410 (17.2)                            | 77 (16.1)                             | 12 (14.1)                      | 11 (19.0)                        |         |
| 30–39                        | 471 (19.8)                            | 86 (18.0)                             | 19 (22.4)                      | 9 (15.5)                         |         |
| 40–49                        | 516 (21.7)                            | 101 (21.2)                            | 21 (24.7)                      | 15 (25.9)                        |         |
| 50–59                        | 472 (19.8)                            | 109 (22.9)                            | 15 (17.6)                      | 18 (31.0)                        |         |
| ≥60                          | 511 (21.5)                            | 104 (21.8)                            | 18 (21.2)                      | 5 (8.6)                          |         |
| Marital status               |                                       |                                       |                                |                                  | <0.001  |
| Married                      | 524 (22.0)                            | 109 (22.9)                            | 18 (21.2)                      | 14 (24.1)                        |         |
| Unmarried                    | 1,705 (71.6)                          | 318 (66.7)                            | 52 (61.2)                      | 31 (53.4)                        |         |
| Divorced/Deceased            | 151 (6.3)                             | 50 (10.5)                             | 15 (17.6)                      | 13 (22.4)                        |         |
| Education level (yr)         |                                       |                                       |                                |                                  | 0.047   |
| ≤9                           | 400 (16.8)                            | 99 (20.8)                             | 13 (15.3)                      | 12 (20.7)                        |         |
| 10–12                        | 988 (41.5)                            | 207 (43.4)                            | 44 (51.8)                      | 28 (48.3)                        |         |
| ≥13                          | 992 (41.7)                            | 171 (35.8)                            | 28 (32.9)                      | 18 (31.0)                        |         |
| Monthly income (million KW)* |                                       |                                       |                                |                                  | 0.010   |
| <200                         | 472 (19.8)                            | 123 (25.8)                            | 19 (22.4)                      | 21 (36.2)                        |         |
| 200–399                      | 1,082 (45.5)                          | 197 (41.3)                            | 37 (43.5)                      | 22 (37.9)                        |         |
| ≥400                         | 824 (34.7)                            | 157 (32.9)                            | 29 (34.1)                      | 15 (25.9)                        |         |
| Urbanicity                   |                                       |                                       |                                |                                  | 0.917   |
| Urban                        | 1,914 (80.4)                          | 389 (81.6)                            | 69 (81.2)                      | 48 (82.8)                        |         |
| Rural                        | 466 (19.6)                            | 88 (18.4)                             | 16 (18.8)                      | 10 (17.2)                        |         |
| Employment                   |                                       |                                       |                                |                                  | 0.917   |
| Employed                     | 1,030 (43.3)                          | 201 (42.1)                            | 36 (42.4)                      | 27 (46.6)                        |         |
| Unemployed                   | 1,350 (56.7)                          | 276 (57.9)                            | 49 (57.6)                      | 31 (53.4)                        |         |
| Religion                     |                                       |                                       |                                |                                  | 0.006   |
| Yes                          | 1,064 (44.7)                          | 245 (51.4)                            | 45 (52.9)                      | 34 (58.6)                        |         |
| No                           | 1,316 (55.3)                          | 232 (48.6)                            | 40 (47.1)                      | 24 (41.4)                        |         |
| Year                         |                                       |                                       |                                |                                  | 0.113   |
| 2013                         | 1,165 (48.9)                          | 258 (54.1)                            | 43 (50.6)                      | 34 (58.6)                        |         |
| 2018                         | 1,215 (51.1)                          | 219 (45.9)                            | 42 (49.4)                      | 24 (41.4)                        |         |

Values are presented as N (%) unless otherwise indicated. \*two cases were missing for income data. \$1=1,100 KW (Korean Won)

**Table 2.** Factor structure of Attitudes Toward Suicide Scale's 29 items

| Factor  | Explained variance (%) | Factor loadings | Cronbach's $\alpha$ |
|---|------------------------|-----------------|---------------------|
| Factor 1. Permissiveness                                    | 10.47                  |                 | 0.733               |
| 18. Suicide a relief  |                        | 0.676           |                     |
| 16. Situations where suicide is the only solution           |                        | 0.611           |                     |
| 20. Consider suicide if incurable disease–myself.           |                        | 0.608           |                     |
| 36. Get help to commit suicide if incurable disease–myself  |                        | 0.607           |                     |
| 17. Could express suicide wish without meaning it–myself    |                        | 0.552           |                     |
| 32. Suicide understandable if incurable disease–people      |                        | 0.508           |                     |
| 29. Give help to commit suicide if incurable disease–people |                        | 0.460           |                     |
| 5. Suicide acceptable means to end incurable disease        |                        | 0.456           |                     |
| Factor 2. Unjustified behavior                              | 7.27                   |                 | 0.593               |
| 2. Suicide can never be justified                           |                        | 0.728           |                     |
| 3. Suicide among the worst thing to do to relatives         |                        | 0.712           |                     |
| 19. Suicides among younger people particularly puzzling     |                        | 0.526           |                     |
| 9. Duty to restrain a suicidal act                          |                        | 0.472           |                     |
| Factor 3. Call for help                                     | 5.51                   |                 | 0.266               |
| 26. Suicides basically signal for help                      |                        | 0.651           |                     |
| 24. Suicide one's own business*                             |                        | 0.555           |                     |
| 13. Should or would rather not talk about suicide*          |                        | 0.431           |                     |
| Factor 4. Preventability/Readiness to help                  | 5.40                   |                 | 0.473               |
| 30. Prepared to help a suicidal person–myself               |                        | 0.736           |                     |
| 1. Can always help  |                        | 0.720           |                     |
| 37. Suicide can be prevented.                               |                        | 0.422           |                     |
| Factor 5. Loneliness  | 5.32                   |                 | 0.496               |
| 25. Loneliness that drives people to suicide                |                        | 0.777           |                     |
| 14. Loneliness can be a reason for suicide                  |                        | 0.640           |                     |
| Factor 6. Reasons for suicide                               | 5.21                   |                 | 0.365               |
| 7. Attempts due to revenge and punishment                   |                        | 0.597           |                     |
| 4. Attempts are impulsive actions                           |                        | 0.573           |                     |
| 35. Attempts due to interpersonal conflicts                 |                        | 0.528           |                     |
| Factor 7. Incomprehensibility                               | 4.54                   |                 | 0.326               |
| 22. Suicide happens without warning                         |                        | 0.736           |                     |
| 28. Relatives have no idea about what is going on           |                        | 0.622           |                     |
| 27. Could express suicide wish without meaning it–myself    |                        | 0.440           |                     |
| Factor 8. Unreliable  | 4.33                   |                 | 0.289               |
| 12. Communication not serious                               |                        | 0.692           |                     |
| 33. People who make threats seldom complete suicide         |                        | 0.593           |                     |
| Factor 9. Nonreversible                                     | 3.88                   |                 | -                   |
| 6. Suicide decision can't be reversed.                      |                        | 0.840           |                     |
| Total   | 51.94                  |                 |                     |

The English expression for each Attitudes Toward Suicide Scale (ATTS) item is the same as the expression in Renberg et al.<sup>17</sup> Reprinted with permission from reference article 17. Modified from Renberg et al.,<sup>17</sup> Development of a questionnaire on attitudes towards suicide (ATTS) and its application in a Swedish population. *Suicide Life Threat Behav* 2003;33:52-64. \*reversely scored item

**Table 3.** Group comparisons of factors and trend analysis along suicidal continuum

|                                      | No suicidal idea<br>(Mean [SD]) | Suicidal behavior (Mean [SD]) |                  |                    | Trend         |         | Group comparison |         |           |
|--------------------------------------|---------------------------------|-------------------------------|------------------|--------------------|---------------|---------|------------------|---------|-----------|
|                                      |                                 | Suicidal<br>idea only         | Suicidal<br>plan | Suicide<br>attempt | J-T statistic | p-value | F                | p-value | Post-hoc* |
| Permissiveness                       | 2.76 (0.61)                     | 2.93 (0.61)                   | 3.09 (0.59)      | 3.19 (0.70)        | 7.824         | <0.001  | 25.322           | <0.001  | a<b<d     |
| Unjustified behavior                 | 4.01 (0.62)                     | 3.91 (0.65)                   | 3.89 (0.80)      | 3.85 (0.77)        | -3.004        | 0.003   | 5.016            | 0.002   | a<c, a>b  |
| Preventability/<br>Readiness to help | 3.54 (0.65)                     | 3.56 (0.65)                   | 3.44 (0.64)      | 3.67 (0.74)        | 0.052         | 0.959   | 1.571            | 0.194   | -         |
| Loneliness                           | 3.26 (0.87)                     | 3.38 (0.85)                   | 3.35 (0.82)      | 3.70 (0.82)        | 4.155         | <0.001  | 7.491            | <0.001  | a<b<d     |

\*a, b, c, and d refer to no suicidal idea, suicidal idea only, suicidal plan, and suicidal attempt, respectively. SD, standard deviation; J-T, Jonckheere-Terpstra

populations.<sup>10,33,34</sup> The tendency that the more permissive the attitude of a person or society, the more frequent the suicidal behaviors<sup>10-12</sup> was observed in our results, where a high score on the “permissiveness” scale increased the odds of suicide ideation, plan, and attempt. Interestingly, as the suicidal intensity increased through the suicidal continuum, the OR of permissiveness also increased, implying that people who have high permissiveness are at a high risk of attempting suicide even after adjusting for other risk factors of suicide. On the contrary, “unjustified behavior” decreased the odds of suicidal idea and attempt, which aligns with the findings of previous studies where negative attitude and religious beliefs made people reconsider their suicide ideation and thus reduced the risk of suicide attempt.<sup>35,36</sup> Longitudinal studies are needed to determine whether these positive or negative attitudes indeed lead to suicide attempt.

There are only a few studies<sup>22</sup> which compared all suicidal idea-plan-attempt groups at once, and none had evaluated trends along the continuum. When evaluating suicide in a clinical setting, it is meaningful to compare the three groups of suicidal idea-plan-attempt as the phenomenon of suicide proceeds to three stages in a continuum as proposed by many researchers.<sup>7,37,38</sup> Our study demonstrates that statistically significant socioeconomic characteristics and increasing/decreasing trends in three factors (“permissiveness,” “unjustified behavior,” and “loneliness”) also supports that suicidal idea-plan-attempt groups have different suicidal characteristics. Differential intervention to these groups should be planned during the course of assessing and treating suicide. For example, suicide attempters take a more permissive attitude toward suicide because they have prior experiences of attempt, which makes suicide more understandable. However, this permissive attitude may act as a precipitating factor for suicide reattempts. Their permissive attitude contributes to the fact that previous suicide attempts are the biggest risk factor for suicide attempts.<sup>39</sup> Therefore, in the case of suicide attempters, it is necessary to educate them repeatedly to change their permissive attitude toward suicide. Also, in implementing preventive policies suicidality, group

specific targeted evaluation and tailored strategies should be organized. Those with suicidal behavior reported loneliness as a cause of suicide. This suggests that reducing loneliness by strengthening the social network may act as a strategy for prevention of suicide. There were several limitations to the current study. First, because of its cross-sectional design, causality could not be established. Longitudinal design is needed to determine whether attitude influences suicide behaviors or vice versa. Second, methodological questions can arise since the current study used varimax method during explorative factor analysis. Considering each factor’s semantic meaning and the correlation between them, it is difficult to confirm that each factor is completely independent. Other methods such as promax method would have been more suitable. However, since the “attitudes” of human beings are ambiguous and difficult to measure, the right angle rotation method that maximizes the factor load may help interpret the data. Third, some ATTS factors resulted in relatively low Cronbach’s  $\alpha$ ; therefore, further studies will be needed to investigate the psychometric properties. Fourth, since suicide attempts occur rarely, only 58 of 3,000 people (1.9%) attempted suicide, and considering the sample size, the statistical power may have been insufficient to construct a complex multivariate model for suicide attempters. However, this study investigated the full suicidal continuum of idea-plan-attempt among the general population of South Korea, and thus explained the necessity of differential approach to different suicidal population.

The main strength of this study was that it not only extracted meaningful factors from the ATTS but also investigated its association with suicidal behavior simultaneously with a sufficiently large sample. This was the first study to show increasing/decreasing trends of attitude scores along the suicidal continuum and analyze the comprehensive association between attitudes toward suicide and suicidality.

In conclusion, our study determined the factor structure of ATTS and investigated the relationship between attitude factors and suicidal behaviors. We extracted four meaningful factors from the data and were able to investigate the association

**Table 4.** Association between factor scores among no suicidal idea, suicidal idea only, suicidal plan, and suicidal attempt groups

|                      | Univariate model    |         |                     |         | Multivariate model* |         |                     |         |                     |         |                     |         |
|----------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|                      | Suicidal idea only  |         | Suicidal plan       |         | Suicide attempt     |         | Suicidal idea only  |         | Suicidal plan       |         | Suicide attempt     |         |
|                      | OR (95% CI)         | p-value | OR (95% CI)         | p-value | OR (95% CI)         | p-value | aOR (95% CI)        | p-value | aOR (95% CI)        | p-value | aOR (95% CI)        | p-value |
| Permissiveness       | 1.60<br>(1.35–1.89) | <0.001  | 2.60<br>(1.18–3.79) | <0.001  | 3.42<br>(2.17–5.38) | <0.001  | 1.49<br>(1.25–1.79) | <0.001  | 2.79<br>(1.84–4.25) | <0.001  | 2.67<br>(1.65–4.33) | <0.001  |
| Unjustified behavior | 0.78<br>(0.67–0.91) | 0.001   | 0.75<br>(0.54–1.03) | 0.079   | 0.68<br>(0.46–1.00) | 0.055   | 0.79<br>(0.67–0.94) | 0.006   | 0.93<br>(0.65–1.33) | 0.689   | 0.64<br>(0.42–0.99) | 0.043   |
| Preventability/      | 1.30<br>(1.11–1.52) | 0.001   | 0.78<br>(0.57–1.09) | 0.147   | 1.37<br>(0.91–2.07) | 0.137   | 1.11<br>(0.94–1.30) | 0.220   | 0.78<br>(0.55–1.12) | 0.179   | 1.38<br>(0.88–2.17) | 0.166   |
| Readiness to help    | 1.19<br>(1.06–1.33) | 0.004   | 1.14<br>(0.89–1.47) | 0.307   | 1.93<br>(1.37–2.71) | <0.001  | 1.08<br>(0.95–1.22) | 0.259   | 0.91<br>(0.68–1.21) | 0.501   | 1.50<br>(1.03–2.20) | 0.036   |

Reference=no suicidal idea. \*multivariate model was adjusted for age, sex, marital status, education, income, and religion. OR, odds ratio; aOR, adjusted odds ratio; CI, confidence interval

between these factors and groups along the suicidal continuum. Permissive attitude toward suicide increased the odds of suicidal behaviors, whereas negative attitude toward suicide decreased the odds. Attitude toward suicide is one of the few modifiable factors in suicide prevention. By investigating the relationship between suicidal behavior and attitude toward suicide, tailored prevention policies that target specific attitudes to suicide can be developed.

### Supplementary Materials

The online-only Data Supplement is available with this article at <https://doi.org/10.30773/pi.2021.0361>.

### Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

### Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

### Author Contributions

Conceptualization: Min Ji Kim, Hyunju Lee. Data curation: Minseok Hong. Formal analysis: Min Ji Kim. Funding acquisition: Jong-Ik Park, Yong Min Ahn. Investigation: Min Ji Kim, Hyunju Lee. Methodology: Min Ji Kim, Hyunju Lee. Software: Yong Min Ahn. Supervision: Sang Jin Rhee, Jong-Ik Park, Yong Min Ahn. Writing—original draft: Min Ji Kim. Writing—review & editing: Daun Shin, Sang Jin Rhee.

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**Supplementary Table1.** Mean and standard deviation (SD) of each item of Attitude Toward Suicide Scale

| Item number | Mean (SD)   |
|-------------|-------------|
| 1           | 3.41 (1.03) |
| 2           | 3.96 (1.00) |
| 3           | 4.37 (0.81) |
| 4           | 2.87 (1.23) |
| 5           | 2.54 (1.07) |
| 6           | 3.07 (1.08) |
| 7           | 2.72 (1.00) |
| 8           | 3.15 (1.10) |
| 9           | 3.92 (0.90) |
| 10          | 3.24 (1.02) |
| 11          | 2.88 (0.96) |
| 12          | 3.30 (0.91) |
| 13          | 3.26 (1.13) |
| 14          | 3.14 (1.13) |
| 15          | 3.20 (0.99) |
| 16          | 2.44 (1.06) |
| 17          | 2.64 (1.07) |
| 18          | 2.60 (1.03) |
| 19          | 3.71 (1.05) |
| 20          | 2.88 (1.07) |
| 21          | 3.02 (0.97) |
| 22          | 3.15 (1.09) |
| 23          | 3.60 (0.93) |
| 24          | 2.27 (0.96) |
| 25          | 3.43 (0.99) |
| 26          | 3.74 (0.86) |
| 27          | 3.53 (1.01) |
| 28          | 3.60 (0.86) |
| 29          | 2.95 (1.12) |
| 30          | 3.26 (0.93) |
| 31          | 3.20 (1.09) |
| 32          | 3.35 (0.97) |
| 33          | 3.73 (0.82) |
| 34          | 2.41 (1.09) |
| 35          | 2.77 (1.02) |
| 36          | 3.02 (1.02) |
| 37          | 3.95 (0.81) |