

Prospective Study on Suicidal Ideation Among Japanese Undergraduate Students: Correlation with Stressful Life Events, Depression, and Depressogenic Cognitive Patterns

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The present study examines the effects of stressful life events, depression, and depressogenic cognitive patterns on suicidal ideation in 500 Japanese undergraduate students. The above factors were assessed at baseline (T1) and two weeks later (T3). At T1, structural equation modeling confirmed that (1) cognitive patterns and depression, but not stressful life events, influence suicidal ideation, and (2) cognitive patterns also influence suicidal ideation through depression. These findings were confirmed in a longitudinal analysis. The results suggest that the effects of stressful life events on suicidal ideation are indirect and are mediated by depressogenic cognitive styles and depressed mood.

Keywords depression, depressogenic cognitive style, stressful life events, suicidal ideation

INTRODUCTION

Suicide has been a great social concern in Japan in recent years (Takahashi, 1995). 1998 was marked by a sudden rise in the rate of completed suicides, with the incidence of deaths due to suicide increasing by 50% from 1997 (19.3 per 100,000) to 1998 (26.0 per 100,000) (Community Police Affairs Division, Community Safety Bureau, 2000).

The suicide rate in Japan has been steadily increasing since 1998. This change is thought to be related to Japan's economic difficulties (Inoue, Tanii, Fukunaga et al., 2006), as a similar dynamic is reported to have occurred in European countries (Pritchard, 1992). Identifying other potential risk factors in Japan is an important part of the overall suicide prevention effort (e.g., Oyama, Watanabe, Ono et al., 2005).

Completed suicide is often preceded by attempted suicide and suicidal ideation (Alexopoulos, Bruce, Hull et al., 1999; Borges, Angst, Nock et al., 2006; De Moore, & Robertson, 1996; Diekstra & Van Egmond, 1989; Fawcett, Scheftner, Fogg et al., 1990; Goldstein, Black, Nasrallah et al., 1991; Hawton, Zahl, & Weatherall, 2003; Owens, Horrocks, & House, 2002; Owens, Wood, Greenwood et al., 2005; Pearce, & Martin, 1994; Pfeffer, Klerman, Hurt et al., 1993; Schwab, Warheit, & Holzer, 1972; Shaffer, Gould, Fisher et al., 1996; Shafri, Carrigan, Whittinghill et al., 1985). Suicidal ideation is prevalent in a variety of populations, and is an important health issue among adolescents and young adults (Shaffer, Gould, Fisher et al., 1996).

Conner, Duberstein, Conwell et al. (2001) have reviewed the literature pertaining to psychological correlates of suicide, and have identified five factors associated with suicidality: (1) impulsivity/aggression, (2) depression, (3) hopelessness, (4) anxiety, and (5) self-consciousness/social disengagement. Depression and other psychiatric disorders are known to be associated with suicidal ideation and suicide attempts (Foster, Gillespie, McClelland et al., 1999; Hawton, 1987; Hawton, Kingsbury, Steinhardt et al., 1999; Inskip, Harris, & Barraclough, 1998). In addition, stressful life events are also known to precede suicides (Paykel, Prusoff, & Meyers, 1975). Thus, the interrelationships between these risk factors should be investigated.

One theory that attempts to explain the onset of depression, and which has attracted the attention of both researchers and clinicians, posits the existence of specific depressogenic cognitive styles. According to Beck (1967, 1972, 1976) and Beck, Rush, Shaw, and Emery (1979), vulnerability to depression is caused by dysfunctional cognitive schemata revolving around themes such as loss, inadequacy, and failure. Although these depressogenic

schemata are continuously present, they are activated by exposure to stressful life events. Following such events, specific negative cognitions appear, taking the form of overly negative beliefs about oneself, one's world, and one's future. These beliefs are termed "automatic thoughts." According to Beck's cognitive theory, negative automatic thoughts do not occur unless individuals are exposed to stressful situations.

Recently more attention has been focused on cognitive factors related to suicidal behavior. Cognitive variables such as attributional style, self-esteem, and hopelessness appear to be important in understanding suicidality (De Man & Leduc, 1995; Keinhorst, de Wilde, Diekstra et al., 1992; Overholser, Adams, Lehnert et al., 1995; Spirito, Overholser, & Hart, 1991; Summerville, Kaslow, Abbate et al., 1994). Among cognitive patterns specifically related to suicidality, hopelessness is more often cited (Beck, Brown, Berchick et al., 1990; Conner, Duberstein, Conwell et al., 2001). Although hopelessness is one component of the negative cognitive triad in Beck's theory, this depressogenic automatic thought also contains overly negative beliefs about oneself and one's world. To our knowledge, the manner in which this negative automatic thought pertains to suicidality has rarely been studied.

We sought to elucidate the correlation between suicidal ideation and stressful life events, depressogenic automatic thoughts, and depressed mood through a longitudinal study of Japanese undergraduate students. Identifying suicide risk factors in this population is of particular importance because suicide is the leading cause of death in both males and females in the 20–29 age group in Japan (Statistics and Information Department, Minister's Secretariat, 2007).

Our hypothesis is that suicidal ideation occurs when an individual is exposed to one or more stressful life events, which in turn activates automatic thoughts, depression, and suicidality.

TABLE 1. Number of Participants, Gender Ratio, and Mean (SD) Age Used in Each Test Occasion

Test occasions	n	Men (%)	Age
Time 1	546	22.7	19.0 (1.5)
Time 2	545	22.8	19.0 (1.5)
Time 3	547	23.4	19.1 (1.5)
Time 4	525	22.9	19.1 (1.5)
Time 5	521	22.6	19.1 (1.5)
Time 6	512	23.8	19.0 (1.3)
Time 7	504	24.0	19.0 (1.4)
Time 8	509	22.2	19.1 (1.3)
Time 9	531	23.0	19.0 (1.3)

METHOD

Participants

We invited undergraduate students from two universities in Kumamoto, Japan. This was a 9-wave weekly prospective study. The number of eligible students was 848, but 2% to 3% of students refrained from participating in the study and not all students attended each session. Usable data were obtained from between 504 and 547 students each week (Table 1). Approximately one-fifth of the students were male. For the present analysis, we used only data from weeks 1 and 3. Of the 546 students who attended the session during week 1, 468 (86%) did so during week 3.

Measurements

Suicidality. Current level of suicidal ideation was rated on a 4-point scale (0 = *never suicidal*, 3 = *almost always suicidal*) by a single item from the Self-rating Depression Scale (ZSDS; Zung, 1965): "I feel that others would be better off if I were dead." The score of this item was positively skewed (skewness = 2.61 and 2.62 for the first and third time point, respectively), and we therefore log-transformed the score to decrease the skewness (to 2.13 and 2.16, respectively).

Stressful Life Events (SLE). Potential stressful life events during the past week were assessed by a single item created *ad hoc*: "Consider events you experienced during the past week which were undesirable or upsetting, or which made you unhappy or sad. Estimate the impact that they had on you using a scale between 0 and 100, where 0 means *no negative effect* and 100 means an *extremely negative effect*." Stressful life events are usually analyzed by counting the number of events and weighting them according to either predetermined coefficients (e.g., Holmes & Rahe, 1967) or situation-specific contextual threats (e.g., Brown & Harris, 1978). However, subjective distress has been reported to be more strongly correlated with psychological symptoms than just the number of events or the weighted impacts of the events (Cohen, Kamarck, & Mermelstein, 1983; Tennant & Andrews, 1978). Several studies have used a single-item scale of perceived stress (e.g., Austin, Hadzi-Pavlovic, Leader et al., 2005).

Automatic Thoughts Questionnaire-Revised (ATQ-R). In order to assess the extent to which an individual experienced negative automatic thoughts, the ATQ-R (Kendall, Howard, & Hays, 1989) was used. The ATQ-R includes 40 items which are scored on a 5-point Likert scale, with 0 = *not at all* and 4 = *all the time*. Examples include, "No one understands me," and "Why can't I ever succeed?" A composite score was used in the present study, with higher scores reflecting a greater degree of negative automatic thoughts. The Japanese version of the ATQ-R was backtranslated into English to confirm that the translation was consistent with the original intent (Tanaka, Uji, Hiramura et al., 2006). The ATQ (Hollon & Kendall, 1980) has been widely used in different languages, e.g., Norwegian (Chioqueta & Stiles, 2004), Turkish (Sahin & Sahin, 1992), and Korean (Kwon & Yoon, 1994).

Self-Rating Depression Scale (ZSDS; Zung, 1965). The SDS is a self-report measure of depressive symptoms which consists of items on a 4-point scale (0 = *never*, 3 = *almost always*). A three-factor structure of the scale has been reported for a Japanese university student population (Kitamura, Hirano, Chen et al., 2004), with factors including the affective, cognitive, and somatic. The present study restricted the ZSDS items to those categorized as affective by the aforementioned study. Mean values were substituted for a missing item only when 5 out of 6 items were answered.

Procedure

Questionnaires were distributed and collected by a class lecturer every week. Data in this present study were collected at three time points over a two-week period with one-week intervals at Time1 (T1), Time2 (T2), and Time3 (T3). The fact that participation was optional and that opting out would not result in negative consequences of any kind was announced orally before the questionnaire was distributed and was stated on the questionnaire face sheet. Anonymity was confirmed, but due to the need to match

questionnaires of different waves to each student, students were asked to create a unique "nickname" for use whenever they answered a questionnaire. This study was approved by the Ethical Committee of the Kumamoto University Graduate School of Medical Sciences (equivalent to the Institutional Review Board).

Statistical Analyses

Statistical analyses were conducted in two stages. First, we examined the relevant data from T1 only. T1 suicidal ideation (log transformed), T1 SLE, T1 ATQ-R, T1 depression, sex, and age were correlated with each other. T1 suicidal ideation was regressed in three steps: (1) age and sex, (2) T1 SLE, and (3) T1 depression and T1 ATQ-R. Using the same variables, we next examined the goodness-of-fit of a model using structural equation modeling. Here we speculated that (1) T1 SLE would influence all the other variables, (2) T1 ATQ-R would influence T1 depression and T1 suicidal ideation, and (3) T1 depression would influence T1 suicidal ideation (Figure 1).

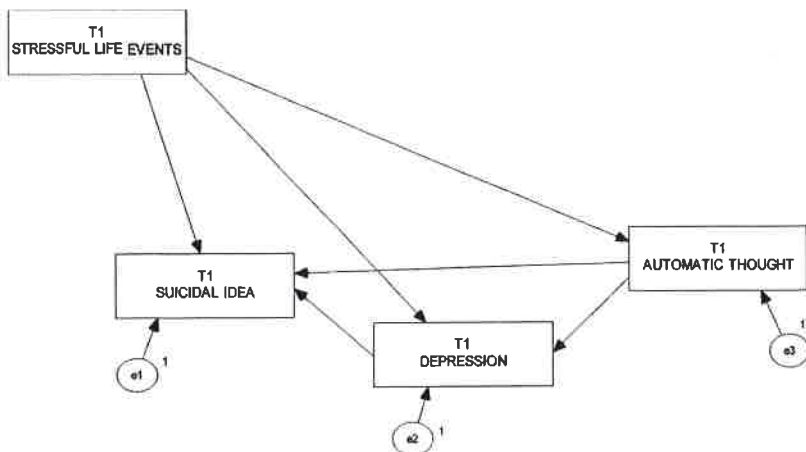


FIGURE 1. Path model used to predict suicidal ideation from the stressful life events through automatic thoughts and depression using data of T1.

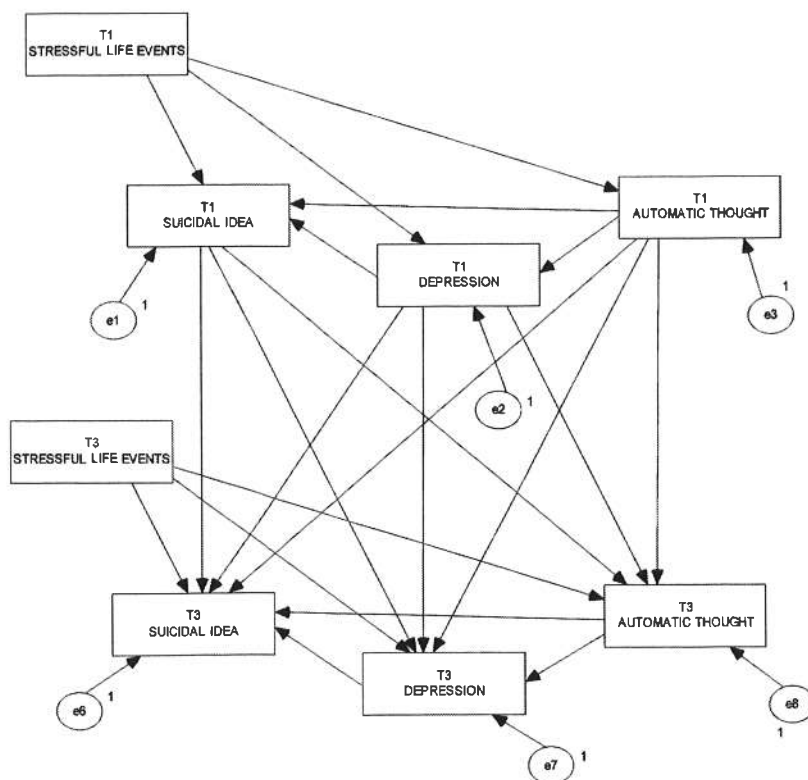


FIGURE 2. Path model to predict suicidal ideation from stressful life events through automatic thoughts and depression using data of T1 and T3.

Second, we examined the subsequent change in suicidal ideation using the data from T3 rather than T2 because we hypothesized that T1 suicidal ideation would influence T2 suicidal ideation more strongly than would T3 suicidal ideation. In fact, the correlation of suicidal ideation was stronger between T1 and T2 ($r = .71$, $p < .001$) than between T1 and T3 ($r = .66$, $p < .001$). T3 suicidal ideation was regressed on (1) age and sex, (2) T1 suicidal ideation, (3) T3 SLE, and (4) T1 depression and T1 ATQ-R. Moreover, we created a model by structural equation modeling in which we speculated for each Time that (1) SLE would influence all the other variables, (2) ATQ-R would influence depression and suicidal ideation,

and (3) depression would influence suicidal ideation (Figure 2). We further hypothesized that suicidal ideation, depression, and ATQ-R in T1 would influence the corresponding variables and other variables in T2.

All statistical analyses were conducted using the Statistical Package for Social Science (SPSS) version 14.0 and Amos 6.0. Structural equation models were improved by deleting paths without statistical significance ($p > .05$) until further reduction in the Akaike Information Criteria with 2 or more points was not possible. The fit of each model with the data was examined in terms of chi-squared (CMIN), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI),

comparative fit index (CFI), and root mean square error of approximation (RMSEA). According to conventional criteria, a *good* fit would be suggested by $CMIN/df < 2$, $GFI > 0.95$, $AGFI > 0.90$, $CFI > 0.97$, or $RMSEA < 0.05$, and an *acceptable* fit by $CMIN/df < 3$, $GFI > 0.90$, $AGFI > 0.85$, $CFI > 0.95$, or $RMSEA < 0.08$ (Schermelehen-Engel, Moosbrugger, & Müller, 2003). The Akaike Information Criterion (AIC) was used to compare different models. A model with an AIC at least 2 points lower is regarded as the superior one.

RESULTS

Cross-Sectional Analyses

As expected, T1 suicidal ideation was positively correlated with T1 stressful life events, T1 ATQ-R, and T1 depression. The latter three variables were also correlated with each other (Table 2). As in a previous clinical report (Cooper, Appleby, & Amos, 2002), the life events cited most frequently in the narrative section were interpersonal events such as relational difficulties with one's partner, family or part-time job colleagues (for example, "I had a quarrel with my boyfriend," "I was barred from the club," or "I was accused of carelessness by part-time boss").

When T1 suicidal ideation was regressed in three steps, T1 SLE only slightly predicted T1 suicidal ideation, whereas both T1 depression and T1 ATQ-R significantly predicted T1 suicidal ideation (Table 3). A total variance of .27 for T1 suicidal ideation could be explained by this regression formula.

The above findings were confirmed by structural equation modeling where T1 SLE failed to influence T1 suicidal ideation, while both T1 depression and T1 ATQ-R influenced T1 suicidal ideation (Figure 3). Moreover, T1 ATQ-R substantially influenced T1 depression.

Longitudinal Analyses

As in the T1 data, T3 suicidal ideation was significantly correlated with SLE, ATQ-R, and depression in the same Time as well as those variables in T1 (Table 4).

In the regression analysis of T3 suicidal ideation, we were interested in whether baseline mood state and cognitive style would determine subsequent suicidal ideation. As expected, T3 suicidal ideation was robustly predicted by T1 suicidal ideation (Table 5). However, after controlling for baseline suicidal ideation, T3 suicidal ideation was predicted by T3 SLE and T1 ATQ-R, which caused T1 depression to

TABLE 2. Means and SDs, and Intercorrelations of the Variables Used in this Study

	1	2	3	4	5	6
1 T1 suicidal ideation (log transformed)	—					
2 T1 stressful life events	.17***	—				
3 T1 ATQ-R	.46***	.24***	—			
4 T1 Depression	.54***	.30***	.52***	—		
5 Sex (1, men; 2, women)	.02	-.05	.09*	.09*	—	
6 Age	.02	.02	-.04	-.07	-.06	—
Mean	0.17	53.6	18.0	5.0	1.8	19.0
SD	0.39	47.1	5.0	3.8	0.4	1.5

ATQ-R, Automatic Thought Questionnaire-Revised.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 3. Regression of T1 Suicidal Ideation as a Dependent Variable and T1 Psychosocial Variables as Independent Variables

	R ² increase	F increase	Standardized beta
Step 1: demographic variables	.002	0.4 (2,494)	
Age			.069
Sex (1, men; 2, women)			-.049
Step 2: stressful life events	.013*	6.6 (1,493)	
T1 stressful life events			-.049
Step 3: mood and cognitive styles	.263***	89.3 (3,491)	
T1 Depression			.298***
T1 ATQ-R			.323***
Adjusted R ² total	.270		

ATQ-R, Automatic Thought Questionnaire-Revised,

lose its significance in predicting T3 suicidal ideation.

Again, we performed structural equation modeling (Figure 4). The patterns of causal paths, which are the same as those used in the cross-sectional analyses, were found between the variables within the same time. SLE no longer significantly

influenced the suicidal ideation at T1 or T3. As expected, each variable in T1 predicted its counterpart in T3. Furthermore, T1 suicidal ideation influenced T3 ATQ-R, but T1 ATQ-R inversely affected T3 depression and T3 suicidal ideation to a slight degree. T1 depression failed to directly influence T3 suicidal ideation.

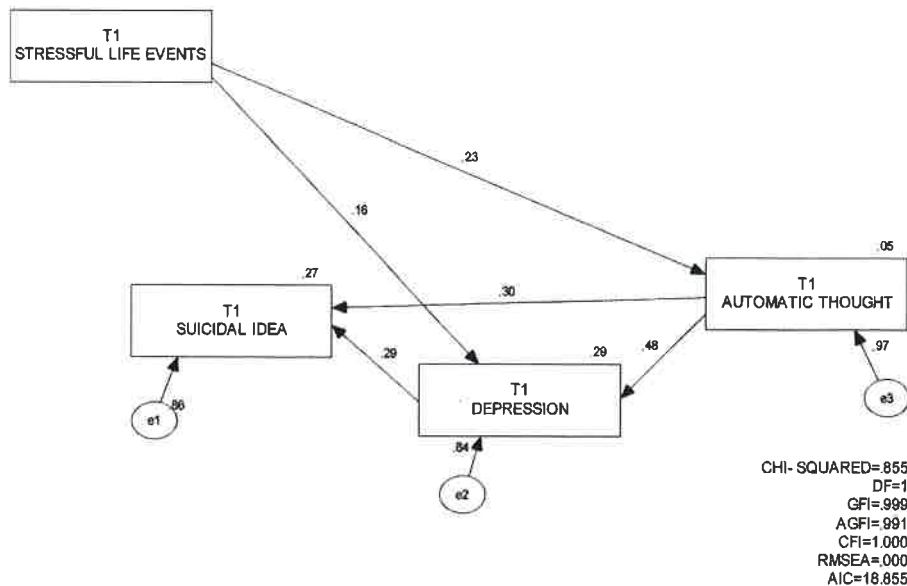


FIGURE 3. Revised model using the data of T1 (N = 480).

TABLE 4. Correlations Between T1 and T3 Suicidal Ideations and the Predictor Variables.

	T1 suicidal ideation	T3 suicidal ideation
T1 suicidal ideation	—	.68***
T1 stressful life events	.17***	.20***
T1 ATQ-R	.44***	.36***
T1 Depression	.54***	.46***
T3 stressful life events	.26***	.30***
T3 Automatic Thought Questionnaire	.50***	.54***
T3 Depression	.44***	.57***
Sex (1, men; 2, women)	.01	.04
Age	.01	-.06

ATQ-R, Automatic Thought Questionnaire-Revised.

DISCUSSION

As expected, the present study shows that suicidal ideation among undergraduate students is associated with stressful life events, automatic thoughts, and depressed mood. Regression analysis demonstrates that stressful life events contribute little to suicidal ideation, but suicidality is substan-

tially predicted by depressed mood and automatic thoughts. Past investigations have indicated that suicidality is made more likely by stressful life events (De Wilde, Kienhorst, Dickstra et al., 1992; Wilburn, & Smith, 2005), but our results suggest that this association is spurious and that suicidality is influenced instead by automatic thoughts and depressed mood. Brown, Harris, and Hepworth (1995) have shown that negative life events characterized by humiliation and entrapment are much more likely than events marked by loss to be associated with the onset of depression in both community and clinical samples.

Based on such observations, Williams, Crane, Barnhofer et al. (2005) have suggested the arrested flight model of suicidal behavior. This model has three components: (1) sensitivity to cues in the environment that signal defeat or humiliation and give rise to an overwhelming need to escape, (2) the sense of being unable to escape, and (3) the sense that this state of affairs will continue indefinitely with no possible rescue. O'Connor (2003) has empirically supported this model.

Mazza and Reynolds (1998) studied high school students for one year and

TABLE 5. Regression of T3 Suicidal Ideation as a Dependent Variable and T1 Psychosocial Variables as Independent Variables

	R ² increase	F increase	Standardized beta
Step 1: demographic variables	.001	0.3 (2,425)	
Age			-.068
Sex (1, men; 2, women)			-.020
Step 2: baseline suicidal ideation	.295***	178.1 (1,424)	
T1 suicidal ideation			.454***
Step 3: stressful life events	.028***	17.6 (1,423)	
T3 stressful life events			.146**
Step 4: mood and cognitive styles	.015**	4.9 (2,421)	
T1 Depression			.032
T1 ATQ-R			.126*
Adjusted R ² total	.330		

ATQ-R, Automatic Thought Questionnaire-Revised.

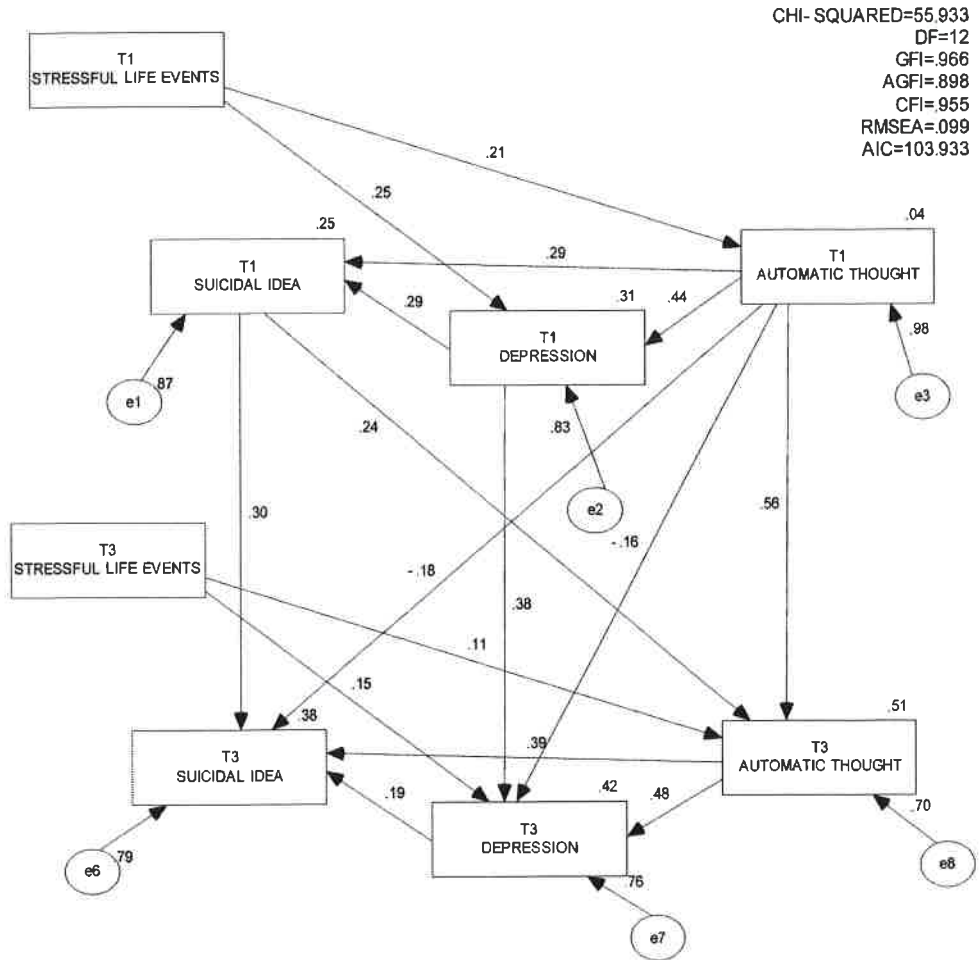


FIGURE 4. Revised model using the data of T1 and T3 (N = 376).

reported that although major and minor life events failed to predict an increase of suicidal ideation, hopelessness and depression did so. Examples of events that Mazza and Reynolds included under the rubric of major life events are parental separation or divorce, breaking up with a girlfriend or boyfriend, and severe illness of a parent. The narrative descriptions provided by students in the present study indicate that the life events they experienced would likely be categorized as minor, rather than major, life events as defined by Mazza and Reynolds (1998).

Our findings may support the first component of Williams' model. Certain individuals are prone to interpret even relatively neutral events as humiliating or defeating. Negative automatic thoughts may play a role in such a mechanism. Thus, the risk of suicidal ideation may be increased not by stressful life events per se, but rather by the fact that the impact of such events is "strengthened" by negative automatic thoughts.

The present study has examined a possible flow from stressful life events

through automatic thoughts and depression towards suicidal ideation using a structural equation model. Our hypothesis that the effect of stressful life events on suicidal ideation is mediated by automatic thoughts and depression is basically supported. It is noteworthy that automatic thoughts directly influence suicidal ideation in addition to mediation through depressed mood. This suggests that people who do not feel depressed can still be suicidal if their negative automatic thoughts are activated by exposure to stressful life events.

Psychiatric disorders other than depression are often followed by suicidal attempts. Psychoautopsy findings have suggested that a small proportion of individuals who have committed suicide did not suffer from any mental disorder prior to their deaths (e.g., Barraclough, Bunch, Nelson et al., 1974). Thus, it is speculated that depression per se is not the sole precedent of suicidal behaviors. Segal, Gemar, and Williams (1999) have found that susceptibility to reactivate negative thoughts and dysfunctional attitudes after recovery from depression significantly predict the recurrence of depression. Similarly, negative automatic thoughts may play an important role in suicidal behavior in such cases.

Limitations of this study should be mentioned. First, we assessed suicidal ideation using the ZSDS, which is not a measure of suicidal attempts. More detailed questions should be used in future replications of this study. Despite its importance in adolescents' mental health, suicidal ideation is not a very accurate indicator of suicidal behavior. However, due to the paucity of empirical studies on the relationship between Beck's cognitive theory and suicidality, the present study encourages replication with a cohort of individuals who have actually attempted suicide. Second, we followed study participants for only two weeks. In order to

obtain greater insight into means of suicide prevention, we should conduct a longitudinal follow-up for a longer period of time.

A third drawback of this study is that the model we adopted assumes that the influence of automatic thoughts on suicidal ideation is mediated by depressed mood. However, the inverse relationship may also be true, that the effect of depressed mood on suicidal ideation is mediated by automatic thoughts. Testing this latter model using the Time 1 data, we obtained the virtually same goodness of fit ($AIC = 18.855$). Using both the T1 and T3 data as in Figure 4, but with the reversed order of the automatic thoughts and depression, we did not obtain a better AIC, but rather a slightly worse one ($AIC = 104.143$). Here again stressful life events lose their significant direct influence on suicidal ideation. This issue needs further clarification in a longitudinal study.

Most suicidal prevention plans have been based on early detection and treatment of depression because completed and attempted suicides are very often preceded by depression. However, a majority of people with depression do not commit suicide (Inskip, Harris, & Barraclough, 1998). Therefore, it is necessary to concentrate on people at high risk of suicidal behavior who are not necessarily depressed. As indicated by our study, cognitive styles and automatic thoughts in particular may be very promising as indicators of such risk factors.

Despite its shortcomings, we believe that the present study has shown that the presence of negative automatic thoughts should be treated as an important determinant of suicidal ideation among Japanese undergraduate students. A possible causal path from stressful life events toward suicidal ideation through cognitive style rather than depressed mood warrants further investigation.

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REFERENCES

- Alexopoulos, G. S., Bruce, M. L., Hull, J., et al. (1999). Clinical determinants of suicidal ideation and behavior in geriatric depression. *Archives of General Psychiatry*, *56*, 1048–1053.
- Austin, M.-P., Hadzi-Pavlovic, D., Leader, L., et al. (2005). Maternal trait anxiety, depression and life event stress in pregnancy: Relationships with infant temperament. *Early Human Development*, *81*, 181–190.
- Barracrough, B., Bunch, J., Nelson, B., et al. (1974). A hundred cases of suicide: Clinical aspects. *British Journal of Psychiatry*, *125*, 355–373.
- Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. Philadelphia: University of Pennsylvania Press.
- Beck, A. T. (1972). *Depression: Causes and treatment*. Philadelphia: University of Pennsylvania Press.
- Beck, A. T. (1976). *Cognitive therapy and emotional disorders*. New York: International University Press.
- Beck, A. T., Brown, G., Berchick, R. J., et al. (1990). Relationship between hopelessness and ultimate suicide: A replication with psychiatric outpatients. *American Journal of Psychiatry*, *147*, 190–195.
- Beck, A. T., Rush, A. J., Shaw, B. F., et al. (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Borges, G., Angst, J., Nock, M. K., et al. (2006). A risk index for 12-month suicide attempts in the National Comorbidity Survey Replication (NCS-R). *Psychological Medicine*, *36*, 1747–1757.
- Brown, G. W. & Harris, T. O. (1978). *Social origin of depression: A study of psychiatric disorder in women*. London: Tavistock.
- Brown, G. W., Harris, T. O., & Hepworth, C. (1995). Loss, humiliation and entrapment among women developing depression: A patient and non-patient comparison. *Psychological Medicine*, *25*, 7–21.
- Chioqueta, A. P. & Stiles, T. C. (2004). Norwegian version of the Automatic Thoughts Questionnaire: A reliability and validity study. *Cognitive Behaviour Therapy*, *33*, 79–82.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396.
- Community Police Affairs Division, Community Safety Bureau (2000). *National Police Agency brief report on suicides in 1999*. Tokyo: National Police agency. (in Japanese)
- Conner, K. R., Duberstein, P. R., Conwell, Y., et al. (2001). Psychological vulnerability to completed suicide: A review of empirical studies. *Suicide and Life-Threatening Behavior*, *31*, 367–385.
- Cooper, J., Appleby, L., & Amos, T. (2002). Life events preceding suicide by young people. *Social Psychiatry and Psychiatric Epidemiology*, *37*, 271–275.
- De Man, A. F. & Leduc, C. P. (1995). Suicidal ideation in high school students: Depression and other correlates. *Journal of Clinical Psychology*, *51*, 173–181.
- De Moore, G. M. & Robertson, A. R. (1996). Suicide in the 18 years after deliberate self-harm: A prospective study. *British Journal of Psychiatry*, *169*, 489–494.
- De Wilde, E. J., Kienhorst, I. C. W. M., Diekstra, R. F. W., et al. (1992). The relationship between adolescent suicidal behaviour and life events in childhood and adolescence. *American Journal of Psychiatry*, *149*, 45–51.
- Diekstra, R. F. W. & Van Egmond, M. (1989). Suicide and attempted suicide in general practice, 1979–1986. *Acta Psychiatrica Scandinavica*, *79*, 268–275.
- Fawcett, J., Scheftner, W., Fogg, L., et al. (1990). Time-related predictors of suicide in major affective disorder. *American Journal of Psychiatry*, *147*, 1189–1194.
- Foster, T., Gillespie, K., McClelland, R., et al. (1999). Risk factors for suicide independent of

- DSM-III-R axis I disorder. *British Journal of Psychiatry*, 175, 175–179.
- Goldstein, R. B., Black, D. W., Nasrallah, A., et al. (1991). The prediction of suicide: Sensitivity, specificity, and predictive value of a multivariate model applied to suicide among 1906 patients with affective disorders. *Archives of General Psychiatry*, 48, 418–422.
- Hawton, K. (1987). Assessment of suicide risk. *British Journal of Psychiatry*, 150, 145–153.
- Hawton, K., Kingsbury, S., Steinhardt, K., et al. (1999). Repetition of deliberate self-harm by adolescents: The role of psychological factors. *Journal of Adolescence*, 22, 369–378.
- Hawton, K., Zahl, D., & Weatherall, R. (2003). Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *British Journal of Psychiatry*, 182, 537–542.
- Hollon, S. D. & Kendall, P. C. (1980). Cognitive self-statements in depression: Development of an Automatic Thoughts Questionnaire. *Cognitive Therapy and Research*, 4, 383–395.
- Holmes, T. H. & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research*, 11, 213–218.
- Inoue, K., Tani, H., Fukunaga, T., et al. (2006). Significant correlation of yearly suicide rates with the rate of unemployment among men results in a rapid increase of suicide in Mie Prefecture, Japan. *Psychiatry and Clinical Neurosciences*, 60, 781–782.
- Inskip, H. M., Harris, E. C., & Barraclough, B. (1998). Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. *British Journal of Psychiatry*, 172, 35–37.
- Kendall, P. C., Howard, B. L., & Hays, R. C. (1989). Self-referent speech and psychopathology: The balance of positive and negative thinking. *Cognitive Therapy and Research*, 13, 583–598.
- Keinhorst, C. W., de Wilde, E. J., Diekstra, R. F., et al. (1992). Differences between adolescent suicide attempters and depressed adolescents. *Acta Psychiatrica Scandinavica*, 85, 222–228.
- Kitamura, T., Hirano, H., Chen, Z., et al. (2004). Factor structure of the Zung Self-rating Depression Scale in first-year university students in Japan. *Psychiatry Research*, 128, 281–287.
- Kwon, S. & Yoon, H. (1994). Construction and utilization of the Korean Version of the Automatic Thoughts Questionnaire. *Student Review*, 29, 10–25.
- Mazza, J. J. & Reynolds, W. M. (1998). A longitudinal investigation of depression, hopelessness, social support, and major and minor life events and their relation to suicidal ideation in adolescents. *Suicide and Life-Threatening Behavior*, 28, 358–374.
- O'Connor, R. C. (2003). Suicidal behaviour as a cry of pain: Test of a psychological model. *Archives of Suicide Research*, 7, 1–12.
- Overholser, J. C., Adams, D. M., Lehnert, K. L., et al. (1995). Self-esteem deficits and suicidal tendencies among adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 919–928.
- Owens, D., Horrocks, J., & House, A. (2002). Fatal and non-fatal repetition of self-harm: Systematic review. *British Journal of Psychiatry*, 181, 193–199.
- Owens, D., Wood, C., Greenwood, D. C., et al. (2005). Mortality and suicide after non-fatal self-poisoning: 16-year outcome-study. *British Journal of Psychiatry*, 187, 470–475.
- Oyama, H., Watanabe, N., Ono, Y., et al. (2005). Community-based suicide prevention through group activity for the elderly successfully reduced the high suicide rate for females. *Psychiatry and Clinical Neurosciences*, 59, 337–344.
- Paykel, E. S., Prusoff, B. A., & Meyers, J. K. (1975). Suicide attempts and recent life events: A controlled comparison. *Archives of General Psychiatry*, 32, 327–333.
- Pearce, C. M. & Martin, G. (1994). Predicting suicide attempts among adolescents. *Acta Psychiatrica Scandinavica*, 90, 324–328.
- Pfeffer, C. R., Klerman, G. L., Hurt, S. W., et al. (1993). Suicidal children grow up: Rates and psychosocial risk factors for suicide attempts during follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 106–113.
- Pritchard, C. (1992). Is there a link between suicide in young men and unemployment? A comparison of the UK with other European community countries. *British Journal of Psychiatry*, 160, 750–756.
- Sahin, N. H. & Sahin, N. (1992). Reliability and validity of the Turkish version of the Automatic Thoughts Questionnaire. *Journal of Clinical Psychology*, 48, 334–340.
- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23–74.
- Schwab, J. J., Warheit, G. J., & Holzer, C. E. III. (1972). Suicidal ideation and behaviour in a general population. *Diseases of the Nervous System*, 33, 745–748.

- Segal, Z. V., Gemar, M., & Williams, S. (1999). Differential cognitive response to a mood challenge following successful cognitive therapy or pharmacotherapy for unipolar depression. *Journal of Abnormal Psychology, 108*, 3-10.
- Shaffer, D., Gould, M. S., Fisher, P., et al. (1996). Psychiatric diagnosis in child and adolescent suicide. *Archives of General Psychiatry, 53*, 339-348.
- Shafri, M., Carrigan, S., Whittinghill, J. R., et al. (1985). Psychological autopsy of completed suicide in children and adolescents. *American Journal of Psychiatry, 142*, 1061-1064.
- Spirito, A., Overholser, J., & Hart, K. (1991). Cognitive characteristics of adolescent suicide attempters. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 604-608.
- Statistics and Information Department, Minister's Secretariat (2007). *Analyses by cause of death in 2006*. Retrieved from Ministry of Health, Labour and Welfare, Japanese Government Homepage: <http://www.mhlw.go.jp/> on September 2, 2007.
- Summerville, M. B., Kaslow, N. J., Abbate, M. F., et al. (1994). Psychopathology, family functioning, and cognitive style in urban adolescents with suicide attempts. *Journal of Abnormal Child Psychology, 22*, 221-235.
- Takahashi, Y. (1995). Recent trends in suicidal behaviour in Japan. *Psychiatry and Clinical Neurosciences, 49*(suppl. 1), 105-109.
- Tanaka, N., Uji, M., Hiramura, H., Chen, Z., et al. (2006). Cognitive patterns and depression: A study of a Japanese university student population. *Psychiatry and Clinical Neurosciences, 60*, 358-364.
- Tennant, C. & Andrews, G. (1978). The pathogenic quality of life event stress in neurotic impairment. *Archives of General Psychiatry, 35*, 859-863.
- Wilburn, V. R. & Smith, D. E. (2005). Stress, self-esteem, and suicidal ideation in late adolescents. *Adolescence, 40*, 33-45.
- Williams, J. M. G., Crane, C., Barnhofer, T., et al. (2005). Psychology and suicidal behaviour: Elaborating the entrapment model. In K. Hawton (Ed.), *Prevention and treatment of suicidal behaviour* (pp. 71-89). New York: Oxford University Press.
- Zung, W. W. K. (1965). A self-rating depression scale. *Archives of General Psychiatry, 12*, 63-70.