

ORIGINAL ARTICLE

What matters for adolescent suicidality: Depressive symptoms or fixed mindsets? Examination of cross-sectional and longitudinal associations between fixed mindsets and suicidal ideation

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Abstract

Background: Fixed mindsets or beliefs about the non-malleability of self-attributes are linked to a wide range of negative psychological outcomes. Its association with suicidal ideation (SI) among young people has not been explored.

Objectives: To examine the association of fixed mindsets of depression, anxiety, and stress and SI; and its mediating role underlying the association between depression and SI.

Methods: A sample of 1393 adolescents ($M_{\text{age}} = 13.04$, $SD = 0.85$, 640 boys) from 11 middle schools voluntarily participated in a two-wave longitudinal study before and during the COVID-19 pandemic with a 9-month interval.

Results: Both depressive symptoms and fixed mindsets were positively and significantly associated with concurrent and future suicidality, after controlling for demographic and socioeconomic status and previous SI. Participants with stronger fixed mindsets were more likely to have SI than those with only depressive symptoms. Also, fixed mindsets mediated the association between depressive symptoms and SI in both cross-sectional and longitudinal models.

Conclusion: The current study provides empirical evidence of the effects of fixed mindsets and SI and the mediating role of fixed mindset between depressive symptoms and SI among young people. Interventions to foster a growth mindset may enhance hope and reduce suicidality among adolescents.

KEYWORDS

implicit theories, mediation model, middle school students, negative emotion, suicidal ideation

INTRODUCTION

Suicide prevention among young people is a global priority (World Health Organization, 2014). Identifying factors and understanding the mechanisms for the

development of suicidality are main suicide prevention efforts. Risk factors for suicidality among young people that have been identified include inequitable social and demographic factors; personality and interpersonal factors; and mental well-being issues such as depression,

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anxiety, and substance abuse (Chu et al., 2017; Dykxhoorn et al., 2017). Since not all identified risk factors are easily modifiable, examination of modifiable factors that predispose individuals to suicidality provides potential ways for reducing the risk of youth suicide (Forte et al., 2021).

Mindsets and mental health

Emerging literature has begun to examine the impact of implicit theories or mindsets - belief of the malleability of personal attributes—on mental well-being (e.g., Kneeland, Dovidio, et al., 2016; King & dela Rosa, 2019; Schroder, Kneeland, et al., 2019). According to the implicit theories, individuals with fixed mindsets believe their attributes are neither changeable nor improvable by attempts and efforts (Dweck, 2013). For instance, those who believe emotions are fixed are associated with less active emotion regulation and are less engaged in regulatory efforts (Kneeland, Dovidio, et al., 2016); fixed mindsets of anxiety predicted future psychological distress (Schroder, Callahan, et al., 2019). In addition, mindsets play an important role in adolescent mental well-being in adversity. In a study among migrant children, believing in the malleability of cognition was found to be associated with more cognitive reappraisal for emotion regulations and higher subjective well-being among adolescents in adverse situations (Zhu, Ni, et al., 2020). Young people with fixed mindsets were found to be more likely to have mental health problems (see a review, Schleider et al., 2015). Fixed mindset of anxiety was associated with less resilience, less effortful treatment, such as counseling other than medication, and more psychiatric symptoms (Schroder, Kneeland, et al., 2019; Schleider & Schroder, 2018; Schroder, 2018).

On the contrary, mental health symptoms may also predict fixed mindsets. A longitudinal study provided evidence that youth with mental health symptoms predicted a subsequent increase of fixed mindsets (Schleider & Weisz, 2016). Young people with negative emotional states may tend to perceive their problems and environments as being out of their personal control (Chorpita & Barlow, 1998), and in turn, may selectively attend to subsequent negative emotions and potential threats, thus exacerbating maladaptive beliefs.

It is noteworthy that the associations between mindsets and mental health may vary in different domains because mindsets are both domain-specific and domain-general (Schroder et al., 2016; Zhu, Zhuang, et al., 2020). Zhu, Ni, et al. (2020) and Zhu, Zhuang, et al. (2020) found that adolescents were more likely to think trait-related attributes (e.g., intelligence and personality) are fixed, while perceived state-related domains (e.g., emotion,

feeling, and behavior) are more likely to change. It was also found that fixed mindsets of depression predicted depressive symptoms, and fixed mindsets of anxiety were more strongly associated with hopelessness and mental health symptoms than the mindset of general emotions (Mullarkey & Schleider, 2020; Schroder et al., 2016; Schroder, Kneeland, et al., 2019). Thus, this study will focus on the mindsets of negative emotions, which may be a specifically related and modifiable factor for youth suicidal risk.

Depression and suicidality among adolescents

Suicide is the fourth leading cause of death among 15–29-year olds around the world (World Health Organization, 2021). The presence of psychiatric disorders, especially depression, is known as one of the most robust contributing factors to the development of suicidality among young people (Evans et al., 2004; Olié et al., 2010). People with suicidal ideation are usually overwhelmed by painful emotions known as “psych-ache” and see death as the “only” solution for resolving temporary and transitory life challenges (Olié et al., 2010). It is noteworthy that most people with psychiatric issues do not contemplate, attempt, or complete suicide. In other words, if individuals consider their negative emotions as temporary and malleable, they are more likely to feel less hopeless and be more resilient than those who believe sufferings are chronic and non-malleable (Kneeland, Dovidio, et al., 2016).

The association between mindsets and suicidality has not received much attention, but it seems that fixed mindsets play an important role in the suicidal process (Olié et al., 2010). Previous studies have found that mindsets differentially predict willingness to tolerate discomfort (Schroder, 2020), and having fixed mindsets may decrease hope for improvement and lead to avoidance coping and hopelessness. Suicidal thoughts emerge among distressed young people if they take a constricted mindset and think of death as the only way to escape the temporarily psych-ache (Tezanos et al., 2021). Examining the specific psychological process contributing to the risk for suicidal behavior may have significant implications in youth suicide prevention. For instance, a previous study among university students found that those with information about the malleability of emotion engaged in more spontaneous cognitive reappraisal than did their counterparts who learned that emotions were fixed during an anxiety-provoking public speaking task (Kneeland, Holen-Hoeksema, et al., 2016). Similarly, compared with the manipulation to promote the growth mindset of

depression among depressive individuals, the manipulation of the belief that depression is a chronic condition resulted in higher depression symptom severity and prognostic pessimism (Zimmermann et al., 2020). In addition, intervention studies teaching adolescents growth mindsets of personality in single-session interventions reported an immediate increase in perceived control and long-term reduced anxiety and depression (Schleider, Abel, et al., 2019; Schleider, Burnette, et al., 2019).

Pandemics affect the physical and mental well-being of all potentially at-risk individuals, especially young people globally. Hong Kong is one of the earliest cities to have identified cases suffered from COVID-19 (Wong et al., 2021) and school closures as a public health strategy to minimize the spread among young people at schools started in late January 2020. The prevalence of clinically elevated depression and anxiety symptoms has doubled based on the findings of a meta-analysis of studies from 29 countries (Racine et al., 2021). This current longitudinal study aims to examine the interaction mechanisms among depression, fixed mindsets, and suicidality at the pre-pandemic and during pandemic periods in Hong Kong. The present study seeks to examine the relationship between mindsets and suicidal ideation and the role of mindsets on the association between depression and suicidal ideation during the COVID-19 pandemic. We hypothesized that (1) fixed mindsets of depression, anxiety, and stress predict concurrent and later suicidal ideation. (2) fixed mindsets mediate the association between depression and suicidal ideation. We tested the hypotheses with a two-wave longitudinal study with baseline (Time 1) at the start of the academic school year (before the pandemic) and with follow-up (Time 2) at the last month of the academic school year (during the pandemic) with a 9-month interval.

METHODS

Procedure and participants

This was a two-wave longitudinal study among middle school students from 11 schools in Hong Kong. Invitations to study were sent to secondary schools in three main areas in Hong Kong, that is, Hong Kong Island, Kowloon, and New Territory. Invitations would stop when at least one school in each of three medium-of-instructions (English, Chinese, and both) joined the study in each of the three areas.

Parental consent and student assent were collected before the survey. Data were collected in classrooms by trained research assistants. The research assistants introduced the surveys to the students, ensured the students knew about their rights about voluntary participation,

answered queries, and provided guidance on how to complete the questionnaire when appropriate. Students were reminded that their teachers could not access their responses to reduce the concern of being labeled and identified. After the students finished the surveys, research assistants packed and sealed the questionnaires in classroom and took the packages back to the office of the first author's university. We prepared both English and Chinese versions of the questionnaire for participants' selection. Ethical approval was granted by the Human Subjects Ethics Sub-Committee of the first author's university (No. HSEARS20161222006). All participants in this study received souvenirs (worth US\$5) after finishing the follow-up questionnaire survey.

Measures

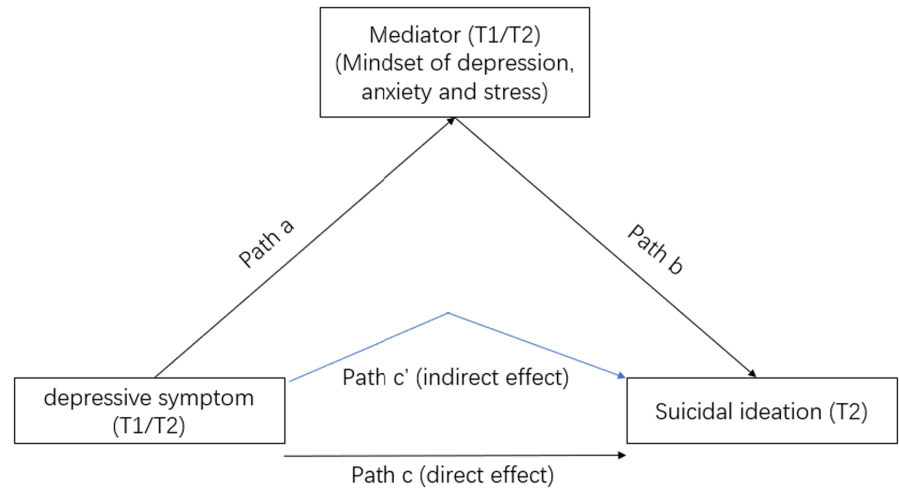
Suicidal ideation (SI) was assessed using the single-item suicidal ideation measure of the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), which was found to be a valid measure to screen suicide risk (Simon et al., 2013; Zhong et al., 2015). Respondents were asked "Over the last two weeks, how often have you been bothered by thoughts that you would be better off dead, or of hurting yourself in some way?" with answers ranging from 0 to 3 (0 = *not at all*, 1 = *several days*, 2 = *more than half days*, 3 = *nearly every day*). Answers of 1 to 3 were coded "yes" as having SI, while 0 was coded as "no" SI in past 2 weeks.

Fixed Mindsets were measured using the 12-item Mindsets of Depression, Anxiety, and Stress Scale (MDASS; Zhu, Zhuang, & Lee, 2021) to assess mindsets about depression, anxiety, and stress. An example item was "When you have a certain level of depression, you really cannot do much to change it." Each item was measured with a six-point Likert scale (1 to 3 = *strongly disagree* to *slightly disagree*; and 4–6 = *slightly agree* to *strongly agree*). Score 1–3 was recorded as 0, indicating a non-fixed mindset, while scores 4–6 were recorded as 1, indicating endorsing fixed mindset. The sum score, ranged from 0 to 12, reflects the level of fixed mindset. The *Cronbach's alpha* was 0.87 at T1 and 0.89 at T2.

Depressive symptoms were assessed using the eight-item Patient Health Questionnaire (PHQ-8; Kroenke et al., 2009). Respondents were asked about the frequency of depressive symptoms in the past 2 weeks. An example item is "Little interest or pleasure in doing things" with answers ranging from 0 (*not at all*) to 3 (*nearly every day*). The sum of the scale (scores 0–24) was the indicator of depression, with higher scores indicating more depressive symptoms. The *Cronbach's alpha* was 0.85 at T1 and 0.85 at T2.

Anxiety symptoms were measured using the seven-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006). Respondents were asked how often the anxiety

FIGURE 1 Sample mediation model. The cross-sectional model: T1 depressive symptom, T1 mindsets and T2 suicidal ideation; the longitudinal model: T2 depressive symptom, T2 mindsets, and T2 suicidal ideation



symptoms bothered them in the past 2 weeks. An example item was “How often did you feel nervous, anxious, or on edge in the past two weeks?” with a four-point Likert scale 0 to 3 (0 = *not at all*, 1 = *several days*, 2 = *more than half days*, 3 = *nearly every day*). The sum of the scale (scores 0–21) was the indicator of anxiety, with higher scores indicating more anxiety. The *Cronbach's alpha* was 0.92 at T1 and 0.93 at T2.

Covariate factors consist of socio-demographic data (i.e., age and gender) and socioeconomic factors. *Socioeconomic status* (SES) was measured using the Family Affluence Scale-Revised (FAS-R) adapted from the FAS III (Hartley et al., 2016). The FAS is one of the standardized measurements to measure SES for child or adolescent responders. The new and refined items included in adaptations were reflecting contemporary economic circumstances, technological advances, as well as cultural, social, and geographical norms in consumption (Currie et al., 2008; Hartley et al., 2016). The FAS-R consists of five components: house size (scores 0–3), car (scores 0–1), household appliances (scores 0–2), learning devices (scores 0–2), and internet accessibility (scores 0–2), a total score ranging from 0 to 10. The composite FAS-R score identified the responders into three levels of SES: low, medium, and high (Svedberg et al., 2016).

Data analyses

A four-step process was adopted for data analyses. First, attribution analysis was used to test the potential influence of missing data. Differences in study variables were examined between participants who participated at T1 only and both T1 and T2. The two groups did not differ on any variables (all $p > 0.05$), suggesting that the data were missing at random.

Second, descriptive analyses were used to compute the mean, standard deviation, skewness, and kurtosis. Paired *t*-tests were used to compare the T1 and T2 responses in depression, anxiety, mindset, and suicidal ideation.

Pearson correlations were used for continuous variables (i.e., depression, anxiety, and mindset), and Spearman correlations were used for the correlation between suicidal ideation and other variables.

Third, the cross-sectional and longitudinal association between MDASS and SI, and suicidal ideation were examined using two hierarchical logistic regressions in two steps. The first logistic regression examined the association between baseline factors (T1) and suicidal ideation after 9 months (T2). Baseline predictors except T1 MDASS were entered in Step 1, and T1 MDASS was entered in Step 2. Male, low SES group and non-suicidal ideation were reference groups. The second logistic regression examined the association between T2 predictors and T2 SI. Step 1 examined the association between T2 factors and T2 SI; T2 MDASS was entered in Step 2.

Fourth, two mediation hypotheses were tested using PROCESS models (Hayes, 2013). Following Hayes's suggestions, bootstrap analysis was conducted with 5000 iterations yielding 95% confidence intervals and indirect effects. First, the mediation model of baseline mindset as mediator for the association between T1 depression and T2 SI was tested: T1 depression was entered as the predictor, T1 MDASS as the mediator, and T2 SI as the outcome. Second, we tested the mediation model of T2 mindset as a mediator for the concurrent association between T2 depression and T2 SI (see Figure 1). Gender, age, SES, and T1 SI were included in all analyses as covariates.

RESULTS

Attrition analysis

At the baseline assessment (T1), 1491 students (695 males) from Grades 7 and 8 participated. Participants were aged between 10 and 16 years old with a mean age of 13.01 ($SD = 0.86$). The T1 measurements were carried out in

TABLE 1 Descriptive statistics and correlation analysis ($N = 1393$)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------------|------|------|-------|--------|------|------|-------|--------|
| 1. T1 depression | – | | | | | | | |
| 2. T1 anxiety | 0.80 | – | | | | | | |
| 3. T1 MDASS | 0.51 | 0.52 | – | | | | | |
| 4. T1 suicidal ideation | 0.49 | 0.51 | 0.34 | – | | | | |
| 5. T2 depression | 0.50 | 0.47 | 0.33 | 0.23 | – | | | |
| 6. T2 anxiety | 0.42 | 0.47 | 0.31 | 0.20 | 0.79 | – | | |
| 7. T2 MDASS | 0.33 | 0.34 | 0.43 | 0.21 | 0.44 | 0.44 | – | |
| 8. T2 suicidal ideation | 0.28 | 0.29 | 0.23 | 0.30 | 0.46 | 0.48 | 0.36 | – |
| Skewness | 1.22 | 1.22 | 0.33 | 1.19 | 1.23 | 1.59 | 0.33 | 1.42 |
| Kurtosis | 1.80 | 1.03 | –1.00 | –0.59 | 1.47 | 2.16 | –0.96 | 0.02 |
| Mean or % | 5.27 | 4.69 | 4.81 | 24.46% | 5.13 | 3.93 | 5.06 | 21.04% |
| SD | 4.58 | 4.83 | 3.45 | – | 4.70 | 4.87 | 3.56 | – |

Note: Pearson correlations were used for continuous variables (i.e., depression, anxiety, and mindset), and Spearman correlations were used for the correlation between suicidal ideation and other variables. All correlation coefficients are significant at the 0.001 level (two-tailed). T1 = Time 1; T2 = Time 2; MDASS = mindset of depression, anxiety, and stress scale. Depression: PHQ-8 score ranges from 0–24. Anxiety: GAD-7 score ranges from 0–21. Suicidal Ideation: the 9th item of PHQ-9 score range from 0–1. MDASS: fixed mindset of depression, anxiety, and stress score range from 0–12.

September 2019 at the start of a new academic year. At T2 assessment in June 2020, at the end of the academic year, 1393 students (640 males; 93.43% of the T1 sample) were retained and had a mean age of 13.04 ($SD = 0.85$). In total, 1393 students participated in both T1 and T2. Only participants validly completing both questionnaire assessments were entered into analyses.

Attrition analysis on depressive symptoms, anxiety symptoms, MDASS, and SI was conducted between participants who provided complete data in two timepoints and those who provided data only at T1. Independent sample t -tests showed no statistically significant differences in depressive symptom ($t_{[1456]} = -1.37, p = 0.171$), anxiety symptom ($t_{[1457]} = -0.96, p = 0.339$), MDASS ($t_{[1413]} = -0.47, p = 0.642$), and SI (Chi-square = 0.27, $p = 0.626$), respectively, between the participants in only T1 and those participated in T1 and T2.

Descriptive statistics and correlation analyses

Descriptive statistics for each measured variable and correlation analyses are summarized in Table 1. Paired sample t -tests were conducted to compare the changes in mindsets, depression, anxiety, and SI of T1 and T2 among the participants who provided complete data in the two timepoints. Results showed participants reported lower depressive symptoms ($t_{[1380]} = 2.86, p = 0.004$), anxiety symptoms ($t_{[1350]} = 5.60, p < 0.001$),

and suicidal ideation ($t_{[1380]} = 2.44, p = 0.015$), but higher fixed mindsets ($t_{[1222]} = -2.32, p = 0.020$) in T2 comparing with their responses in T1.

Correlational analyses indicated mental health measures and mindsets were significantly and positively associated with SI at both timepoints. Only gender among the covariate variables was significantly associated with depressive and anxiety symptoms, mindsets, and SI at T2 (see Table 1). At T2, girls reported significantly more mental health symptoms, more fixed mindsets, and SI than boys.

Relation between mindset and SI

As for the hierarchical logistic regression on longitudinal association, results showed that adolescents with stronger fixed mindset at baseline were significantly more likely to have SI (OR = 1.08, 95% CI = 1.03–1.14), after controlling for baseline factors, including depression, anxiety, and demographic, SES variables, and baseline SI. This indicated that every additional score in MDASS in baseline was 1.08 times more likely to report SI 9 months later. The other two significant predictors were gender (OR = 1.52, 95% CI = 1.12–2.07) and T1 SI (OR = 2.55, 95% CI = 1.78–3.65). Baseline depression symptom was significantly associated with SI but became insignificant after entering T1 mindset (see Table 2). Age and SES were not significantly associated with T2 SI.

Table 3 shows the result of hierarchical logistic regression on the cross-sectional association among the T2

TABLE 2 Hierarchical logistic regression coefficients and 95% confidence intervals for the relationship between time 1 mindsets and time 2 suicidal ideation

| Predictors | Step 1 | | Step 2 | |
|--------------------------|---------|------------|---------|------------|
| | OR | 95% CI | OR | 95% CI |
| Gender (female) | 1.60** | 1.17, 2.17 | 1.52** | 1.12, 2.07 |
| Age | 0.88 | 0.74, 1.04 | 0.87 | 0.73, 1.04 |
| SES group | | | | |
| SES group (1) | 0.89 | 0.53, 1.47 | 0.86 | 0.51, 1.43 |
| SES group (2) | 0.84 | 0.59, 1.19 | 0.84 | 0.59, 1.20 |
| T1 depression | 1.06* | 1.01, 1.12 | 1.05 | 0.99, 1.10 |
| T1 anxiety | 1.04 | 0.99, 1.09 | 1.03 | 0.98, 1.08 |
| T1 suicidal ideation (Y) | 2.63*** | 1.83, 3.76 | 2.55*** | 1.78, 3.65 |
| T1 fixed mindset | | | 1.08** | 1.03, 1.14 |
| Pseudo- R^2 | 0.161 | | 0.171 | |

Note: T1 = Time 1; SES = socioeconomic status; OR = odds ratio; 95% CI = 95% confidence interval; Pseudo- R^2 = Nagelkerke's R^2 .

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

TABLE 3 Hierarchical logistic regression coefficients and 95% confidence intervals for the relationship between time 2 mindsets and time 2 suicidal ideation

| Predictors | Step 1 | | Step 2 | |
|------------------|---------|-------------|---------|------------|
| | OR | 95% CI | OR | 95% CI |
| Gender (female) | 1.16 | 0.82, 1.65 | 1.00 | 0.70, 1.44 |
| Age | 0.89 | 0.728, 1.08 | 0.86 | 0.71, 1.05 |
| SES group | | | | |
| SES group (1) | 0.75 | 0.42, 1.36 | 0.75 | 0.41, 1.36 |
| SES group (2) | 0.71 | 0.48, 1.05 | 0.69 | 0.46, 1.03 |
| T2 Depression | 1.15*** | 1.09, 1.21 | 1.12*** | 1.06, 1.19 |
| T2 Anxiety | 1.19*** | 1.13, 1.25 | 1.16*** | 1.10, 1.23 |
| T2 Fixed Mindset | | | 1.16*** | 1.10, 1.22 |
| Pseudo- R^2 | 0.377 | | 0.406 | |

Note: T1 = Time 1; T2 = Time 2; SES = socioeconomic status; OR = odds ratio; 95% CI = 95% confidence interval. Pseudo- R^2 = Nagelkerke's R^2 .

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

factors and T2 SI. T2 MDASS was a significant predictor of T2 SI, recording an odd ratio of 1.16 (95% CI = 1.10–1.23). This indicated that participants who reported one higher score in fixed mindset were 1.16 times more likely to report SI. Both depression and anxiety symptoms were both significant associated factors for the concurrent SI, with $OR_{depression} = 1.12$, 95% CI = 1.06–1.19; $OR_{anxiety} = 1.16$; 95% CI = 1.10–1.23. (see Table 3). Gender, age, and SES were not significantly associated with T2 SI.

Mediation role of fixed mindsets on the association between depression and SI

Two mediation models were conducted. The longitudinal mediation of T1 mindsets on the association

between T1 depression on T2 SI (Mediation model: T1D→T1MDASS→T2SI), controlling T1 SI, demographic, and SES factors (see Table 4). The effects of T1 depressive symptom on the mindsets ($b = 0.36$, 95% Boot CI = 0.32–0.40), and T2 mindset on T2 SI ($b = 0.09$, 95% Boot CI = 0.04–0.13) were both positive and significant. The direct effect of T2 depression on T2 SI was significant ($b = 0.05$, 95% Boot CI = 0.02–0.09). The indirect effect (IE = 0.03) was statistically significant, 95% Boot CI = 0.014–0.05), indicating a positive predictive relationship between depression and SI as partially mediated through prior fixed mindsets of depression, anxiety, and stress.

The cross-sectional model tested the mediation of T2 fixed mindsets on the association between T2 depression on T2 SI (Mediation model: T2D→T2MDAS→T2SI) controlling demographic and SES factors (see Table 5).

TABLE 4 Regression results of testing the mediation of T1 mindset in the relationship between T1 depression and T2 suicidal ideation

| | <i>B</i> | <i>SE</i> | <i>t/z</i> | <i>p</i> | <i>LLCI</i> | <i>ULCI</i> |
|---|----------|-----------|------------|----------|-------------|-------------|
| Effect of T1 depression on T1 fixed mindset (a) | 0.359 | 0.022 | 16.442 | 0.000 | 0.316 | 0.402 |
| Effect of T1 fixed mindset on T2 SI (b) | 0.087 | 0.025 | 3.535 | 0.000 | 0.039 | 0.135 |
| Direct effect of T1 depression on T2 SI (c) | 0.054 | 0.019 | 2.787 | 0.005 | 0.016 | 0.092 |
| Indirect effect (c') bootstrap | 0.031 | 0.009 | | | 0.014 | 0.050 |

Note: T1 = Time 1; T2 = Time 2; SI = suicidal ideation; LLCI and ULCI are the 95% bootstrap confidence intervals from 5000 bootstrap replicates.

TABLE 5 Regression results of testing the mediation of T2 mindset in the relationship between T2 depression and T2 suicidal ideation

| | <i>B</i> | <i>SE</i> | <i>t/z</i> | <i>p</i> | <i>LLCI</i> | <i>ULCI</i> |
|---|----------|-----------|------------|----------|-------------|-------------|
| Effect of T2 depression on T2 fixed mindset (a) | 0.303 | 0.021 | 14.496 | 0.000 | 0.262 | 0.344 |
| Effect of T2 fixed mindset on T2 SI (b) | 0.169 | 0.027 | 6.302 | 0.000 | 0.117 | 0.222 |
| Direct effect of T2 depression on T2 SI (c) | 0.210 | 0.021 | 10.084 | 0.000 | 0.170 | 0.251 |
| Indirect effect (c') bootstrap | 0.051 | 0.01 | | | 0.034 | 0.069 |

Note: T1 = Time 1; T2 = Time 2; SI = suicidal ideation; LLCI and ULCI are the 95% bootstrap confidence intervals from 5000 bootstrap replicates.

The effects of T2 depressive symptom on the mindsets ($b = 0.30$, 95% *Boot CI* = 0.26 to 34), and T2 mindset on T2 SI ($b = 0.17$, 95% *Boot CI* = 0.12 to 0.22) were both positive and significant. The direct effect of T2 depression on T2 SI was significant ($b = 0.21$, 95% *Boot CI* = 0.17 to 0.25). In other words, the indirect effect (IE = 0.051) is statistically significant (95% *Boot CI* = 0.04 to 0.07), indicating a positive predictive relationship between depressive symptoms and SI as partially mediated through fixed mindsets of depression, anxiety, and stress.

DISCUSSION

This study examines the association between mindsets and suicidality using a two-wave longitudinal study. There seem to be some differences in the students' psychological well-being at T1 and T2. It is interesting to note that lowered levels of depression, anxiety, and suicidal ideation were found in T2, and female students had poorer well-being than boys. In general, it is found that fixed mindset of depression, anxiety, and stress is a robust predictor of present and future SI. The mediation models showed that fixed mindsets partially mediate the association between depressive symptom and SI. This suggests that although depressive symptom may increase the risk of SI, being fixated that the negative reactions to psychological strains cannot subside influences the way adolescents see their ways out to their temporary problems and think that death might be a relief.

Although it was found that the psychological well-being of young people deteriorated during the COVID-19 period internationally (Racine et al., 2021), our young people in the longitudinal studies reported higher levels of depression, anxiety, and SI in 2019 before the

COVID-19 impacted Hong Kong. These findings can be understood with the unique contextual setting in Hong Kong. When the first wave of the study was conducted, Hong Kong was undergoing the largest and longest socio-political unrest in which young people were the main participants. The school closure, public transportation interruption, and repeated media reports about the social unrest may cause disturbances to early adolescents, although they did not participate directly in the events. A local unpublished survey among 322 young people aged between six and 17 revealed that the most concerned issues to them were the COVID-19 pandemic and the social unrest during the last year (Wong, 2020). In addition, schools begin in September each year, which has been regarded as one of the most stressful months in an academic year. The challenge of new routine after a long summer break, along with the concerns about academic workload changes and social pressure, may cause back-to-school stress to students (Beilock, 2011). Combining the impacts of the social unrest and being stressed academically, the psychological well-being of young people in Hong Kong reached its lowest level in 2019. Then, after several months of school closures and changes to online learning due to the COVID-19 in 2020, students returned to schools when the T2 of the study was conducted. Although the level of suicidal ideation was still high, it seems that being able to get back to the school routine benefited some of the students. It was also found that more students reported increased social support from family and peers and improved lifestyle during the pandemic (Zhu, Zhuang, & Ip, 2021). These contextual factors may help to explain the surprise findings of better psychological well-being at T2 than T1.

The findings about the strong association between fixed mindsets and suicidality found in this study can be

used to support the earlier postulations about the role and function of psychological pain in the development of suicidality proposed by Shneidman (1998). Suicide is an effort to stop the unbearable flow of negative affects (Shneidman, 1998) and when one suffers from depression, anxiety, and stress and thinks the symptoms are chronic and unmalleable, that person would be more likely to be despairing and frustrated than those who think the symptoms can be changed and improved later. Fixed mindsets of depression, anxiety, and stress may also be a potential risk for suicide. Taking psychological sufferings as unchanged or incurable problems may be a more direct cause of a sense of hopelessness and cue the idea that suicide is a possible way out of the pain (Shneidman, 1998).

Furthermore, fixed mindsets and hopelessness are highly associated (Mullarkey & Schleider, 2020). Hopelessness also leads to suicidality (Van Orden et al., 2010); for instance, people with incurable diseases, such as AIDs or brain cancer, have higher risks for suicide because they are hopeless about recovery and endure pain and suffering of the disease (Van Orden et al., 2010). As depression, anxiety, and stress cause psychological pain, fixed mindsets of these symptoms may cause suicidal fantasies and suicidal acts, which are efforts to escape or put a stop to the psychological pain that is believed to be unchangeable (Shneidman, 1998). There is a daily saying in Chinese that “*ai mo da yu xin si* (哀莫大於心死)” which means that there is no sadness among all worse than being in despair, and this statement indicates the destructive power of being hopeless and disbelieving in change. On the contrary, believing that psychological pain can be improved may ease the worry of enduring pain and may increase one’s tolerance of current affective symptoms as bearable and temporary, which can foster hope during the difficult time. Dogra et al. (2011) examined the relationships between hope, meaning of life, and suicidality and found that future expectations and coping beliefs of reasons for living and the presence of meaning in life acted as common factors for both hope and suicidal ideation but in the opposite direction. Turner (2005) also stated that hope acted as a driving force (passion, energy, and drive). Knowing that things would go well in life for participants to achieve specific goals protect one to engage in destructive behaviors. Interventions that are hope oriented cognitive behavior therapies may have a protective effect on young people with fixed mindsets in negative emotions and ability to cope with them (Snyder et al., 2000).

It is also worth to mention that mindsets for psychological issues matter for suicidality because of its impact on attribution and emotion regulation, which are strongly related to coping, help-seeking, and treatment choices (Kneeland, Dovidio, et al., 2016; Kneeland,

Holen-Hoeksema, et al., 2016; Schroder, Kneeland, et al., 2019; Yeager et al., 2016). Like previous studies, the current study suggests people with affective symptoms had a 10–20% higher chance of suicidality. Further, the current study found that having fixed mindsets of depression, anxiety, and stress was associated with future suicidal risk. Negative emotions and psychological distresses may be inevitable. But, the mindset on these ups and downs matters more. Fixed mindsets are associated with more negative attribution, less favorable emotion regulation, poor self-regulation, and more hostile coping (Burnette et al., 2013; De Castella et al., 2013; Yeager et al., 2011, 2013). On the contrary, growth mindsets buffer the influence of stress events and lead to more cognitive reappraisal, active help-seeking and choosing effortful treatment, and better adjustment to life changes (Schroder, Kneeland, et al., 2019; Schroder et al., 2017; Zhu, Ni, et al., 2020). The mindsets on psychological distress and subsequent coping behaviors, other than simply the distress itself, may matter more on whether the suicidal thoughts are triggered.

The findings of the current research have several practical implications. First, as mindsets of depression, anxiety, and stress can play a role in emotion regulation, intervention aimed at decreasing fixed mindsets and strengthening growth mindset may increase perceived control of the symptoms and positive coping. Also, the literature supports the efficacy of brief growth mindset intervention (Schleider & Weisz, 2018). Therefore, such intervention on promoting a growth mindset on depression, anxiety, and stress would be highly potential and feasible in decreasing the risk of suicidal thoughts. Second, the current study found that fixed mindsets of depression, anxiety, and stress play a role in developing current and future SI, early identification and assessment of one’s fixed mindsets as part of suicide assessments is proposed. Third, fostering a growth mindset about mental health symptoms would be helpful to decrease the psychological burden for adolescents in seeking help, thereby decreasing the negative impact of the stigma of mental health problems.

LIMITATIONS

The current research had several limitations. First, the measures were self-reported and were subject to the influence of social desirability even though the study was already administered by trained research assistants in the classrooms and participants were reassured that their answers were confidential. Second, we used a single-item dichotomous measure of SI and were unable to examine the severity of suicidality. Considering the limited survey

time in classroom in half-day school resumption during COVID-19 pandemic and the concerns about asking extensively about suicidality during the COVID-19 period, a validated single-item measure of SI was the most feasible approach to measure SI. Third, this study examined the association of mindsets and suicidality among a community sample of adolescents. Further studies should also examine the association among clinical samples with depression and different age cohorts to expand the generalizability.

Despite the aforementioned limitations, this study provides empirical support to the classic theoretical postulation that psychological pain, tunnel vision, and suicidality are intertwined using longitudinal data. This study also provides a strong argument about the nature of causal relationships between mindset and suicidal ideation (Jose, 2016). Also, this study marks a significant step forward in understanding how mindsets or implicit theories are associated with SI. Instead of the mindset of intelligence and personality, our specific focus on the mindsets on depression, anxiety, and stress is an extension of mindset study. The focus on the interaction between mindsets of mental health as a mechanism underlying the relation of depression and suicidality addresses a specific avenue for suicide prevention among people who suffer from depression.

CONCLUSION

The present study is the first to provide empirical evidence for the association among depression symptoms and mindsets of psychological issues, and SI and to examine the mediation association of mindset on the relationship between depressive symptoms and SI among Chinese young people. The findings invite the formulation of interventions to reduce the fixed mindsets of depression, anxiety, and stress or promoting malleability belief of psychological distresses, which may reduce the risks of adolescent suicidality.

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CONFLICT OF INTEREST

None declared.

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