RESEARCH ARTICLE

Hope and Hopelessness: The Role of Hope in Buffering the Impact of Hopelessness on Suicidal Ideation

Jenny M. Y. Huen1, Brian Y. T. Ip2, Samuel M. Y. Ho3, Paul S. F. Yip1,4*

1 Hong Kong Jockey Club Centre for Suicide Research and Prevention, University of Hong Kong, Hong Kong Special Administrative Region, China, 2 Department of Psychology, University of Hong Kong, Hong Kong Special Administrative Region, China, 3 Department of Applied Social Sciences, College of Liberal Arts and Social Sciences, City University of Hong Kong, Hong Kong Special Administrative Region, China, 4 Department of Social Work and Social Administration, University of Hong Kong, Hong Kong Special Administrative Region, China

* sfpyip@hku.hk

Abstract

Objectives

The present study investigated whether hope and hopelessness are better conceptualized as a single construct of bipolar spectrum or two distinct constructs and whether hope can moderate the relationship between hopelessness and suicidal ideation.

Methods

Hope, hopelessness, and suicidal ideation were measured in a community sample of 2106 participants through a population-based household survey.

Results

Confirmatory factor analyses showed that a measurement model with separate, correlated second-order factors of hope and hopelessness provided a good fit to the data and was significantly better than that of the model collapsing hope and hopelessness into a single second-order factor. Negative binomial regression showed that hope and hopelessness interacted such that the effect of hopelessness on suicidal ideation was lower in individuals with higher hope than individuals with lower hope.

Conclusions

Hope and hopelessness are two distinct but correlated constructs. Hope can act as a resilience factor that buffers the impact of hopelessness on suicidal ideation. Inducing hope in people may be a promising avenue for suicide prevention.
Introduction

People react differently to stressors in life, with some individuals deliberately putting an end to their lives in the face of adversity and others endeavouring to proceed. The key to this difference has given rise to suicidology, the scientific study of suicide. Over the last few decades, suicidology has focused on the relationship between various risk factors (in particular negative cognitive factors) and suicide [1–5]. For example, the association between suicidal ideation and psychopathological constructs such as depressive symptoms and hopelessness have been addressed extensively [6–8]. Although the presences of these psychopathological constructs are strong predictors of suicidality, it should not be overlooked that some individuals deal with their hardship in a positive way. The positive elements that motivate people to adopt coping strategies instead of suicidal behaviour in the face of adversity, like any other content associated with a decrease in suicide, may be conceptualized as Papageno effect [9]. Papageno is a character in the famous Mozart’s opera “The Magic Flute” and in one of the scenes Papageno despairs at losing his beloved girl and attempts suicide. His suicidal act is immediately stopped by three child-spirits who later on advise Papageno of a coping strategy. Papageno eventually copes positively with the suicidal crisis after adopting the coping strategy. Niederkrotenthaler and his colleagues [9] studied the associations between media content and suicide rates and they found that coverage on positive coping in adverse circumstances in media reports about suicidal ideation has a Papageno effect and decreases suicide. Existing models of psychopathology and suicidality, with a focus on the association between psychopathological constructs and suicide, cannot account for the Papageno effect exerted by the positive elements which motivate people to face their adverse circumstances in a positive way. This limitation has led to a positive psychology movement for the use of positive psychological constructs in the investigation of psychopathology and suicidality [10–13]. For example, there is on-going interest in incorporating the concept of resilience into the suicidality paradigm [10,14]. Johnson and her colleagues [10] performed an extensive review of 77 suicidality studies that investigated the role of at least one positive psychological construct (a.k.a. resilience factor) in moderating the association between a risk factor and an outcome of suicidality, and introduced a buffering framework to investigate the role of resilience factors (e.g. positive attributional styles & agency) in buffering the impact of risk factors (e.g. hopelessness & perfectionism) on suicidality. Using this framework, the buffering effect of a wide range of positive psychological constructs on suicidal thoughts and behaviours can be explored. Kleiman and his colleagues [15] examined the roles of gratitude and grit as resilience factors against suicidal ideations and they found that gratitude and grit interacted that individuals with higher levels of gratitude and grit at baseline have fewer suicidal ideations over time. In another study [16], Kleiman and his colleagues further provided evidence for the role of gratitude in buffering the association between suicidal ideation and its high risk factors, hopelessness and depressive symptoms. Yet, they did not examine the role of grit in buffering suicide risks associated with hopelessness and depressive symptoms in a similar way. The construct of grit (defined as the extent of perseverance and passion in pursuit of long-term goals [17]) is closely related to the components of hope (consisting of goal-directed determination and planning of ways to meet goals [18]). In the present investigation, a relatively less studied but promising resilience factor based on the adaptive cognitive style of hope will be explored for its buffering impact on suicidal ideation using the buffering framework.

The notion that hope may buffer individuals against suicidal ideation is built on empirical findings in the literature suggesting that hope buffers individuals against psychopathology [19–21] and that hope contributes to better outcomes in a variety of negative situations [18,22–26]. A few studies have considered Snyder’s hope construct within the context of suicidal ideation [27–28] and acquired capability for suicide [29]. The broad benefits of having high level of
hope, along with the relevant findings in the literature that hope buffers individuals against psychopathology as well as suicidality, suggest that hope is a promising factor to be examined under the buffering framework for suicidality. According to the theory of hope proposed by Snyder and his fellows [18], low-hope individuals fail to generate alternative pathways either to achieve a blocked goal or to formulate new attainable goals, and thus are prone to suicidal ideation in the face of stressors. However, it is inadequate if we simply test whether high-hope individuals are being associated with lower suicidal ideation than low-hope individuals. As pointed by Johnson and her colleagues [10] in conceptualizing the buffering framework, the validation of proposed resilience factors should go beyond examining the bivariate association between resilience factors and their outcomes. Even though high hope is found to be associated with reduced suicidal ideation, it does not necessarily establish the positive effect of hope as a resilience factor. It may simply demonstrate a reduced risk to its associated risk factor (such as hopelessness) which results in reduced suicidal ideation. In other words, it is not clear whether it is the hope construct or hopelessness construct that should be targeted for research (in predicting suicidal ideation) and psychotherapy (in reducing suicidal ideation). Underlying this problem is a more fundamental question concerning whether hope is simply the inverse of hopelessness, which is a controversial topic to a number of researchers, psychologists and psychiatrists in the field [19, 30–33]. Low hope (characterized by having a lack of positive expectancies for the future) may easily be taken as hopelessness—a state of having increased negative expectancies for the future [34–35]. Hope and hopelessness have been considered to be similar constructs since both tap future-oriented expectancies [36–37], making them appear to be opposite ends of a single bipolar spectrum. However, having increased negative expectancies was not equivalent to having reduced positive expectancies, as illustrated by the findings of a study conducted by MacLeod, Rose, and Williams [38]. In the study, they analysed the patterns of future-orientated expectancies of a group of recent suicide attempters and found that compared with matched controls, recent suicide attempters were having fewer positive future expectancies but no greater negative future expectancies. While these findings suggest that positive future expectancies (encompassed by the hope construct) and negative future expectancies (encompassed by the hopelessness construct) may differ qualitatively, empirical research on the factor structure of both constructs is needed before concluding whether hope and hopelessness constitute opposite ends of a single factor or two separate factors. The present study was conducted for this purpose and the significance of this study lies on an empirical investigation of the two constructs and their relationship to suicidal ideation. This study goes beyond the examination of a direct association between hope and suicidal ideation to investigate hope as a resilience factor which buffers the strength of the association between hopelessness and suicidal ideation. The rationale for this investigation is based on the buffering framework of Johnson and her colleagues [10] which proposes that a resilience factor should be viewed as a separate dimension to the risk factor, and that the resilience factor (i.e., hope in the present study) interacts with the risk factor (i.e., hopelessness in the present study) to reduce the negative impact of the risk factor on an outcome of suicidality (i.e., suicidal ideation in the present study).

In the following sections, the hope construct and the hopelessness construct will be reviewed in their dominant theories (namely Snyder’s theory of hope and Beck’s theory of hopelessness) in the literature, followed by a comparison between the two constructs and an application of the buffering framework in our empirical study to investigate the role of hope in reducing the impact of hopelessness on suicidal ideation.
Hope under Snyder’s Theory of Hope

In line with the positive psychology movement, Snyder and his colleagues [18] developed a theory of hope (a.k.a. Snyder’s theory of hope) which defines hope as “a cognitive set that is based on a reciprocally derived sense of successful goal-directed determination (termed as agency) and planning of ways to meet goals (termed as pathways) (p. 571)”. Agency is a sense of determination in achieving goals, which is the motivational component of hope. People with high agency thinking have a strong motivation and great drive to achieve their goals, even when they face difficulties. Pathways refer to one’s ability to generate methods and plans to achieve goals. People with high pathways thinking are more likely to generate more than one pathway to reach a particular goal. Hope is the sum of agency thinking and pathways thinking; both components interact and sustain each other [39].

Snyder [40] pointed out that although previous conceptualizations of hope were goal-directed; they did not detail the cognitive process that reflects one’s hopeful thinking and the means by which goals are pursued. The dual emphasis on the goal itself and the thinking process in pursuit of the goal make Snyder’s theory of hope distinctive from earlier theories of hope [19–21,35]. Most importantly, the connotation of positive expectation of goal attainment in early hope theories has been deemphasized in Snyder’s hope construct. In fact, re-goaling is possible under Snyder’s theory of hope when one fails to achieve the original goal [41].

Hopelessness under Beck’s Theory of Hopelessness

In 1974, Beck and his colleagues [34] developed a theory of hopelessness to account for depression and they defined hopelessness as the extent of negative attitudes about the future and conceptualized it as the perceptual experience of the anticipation of undesirable situations or consequences that are largely beyond one’s control. Notably, Beck’s theory of hopelessness takes into account of agency-like thoughts, but the idea of goal pursuit is not considered.

Beck’s theory of hopelessness has been applied to understand suicidal behavior [42] and hopelessness has consistently been shown to be one of the best predictors of suicidal ideation and eventual suicide [43–44]. In a 10-year prospective study by Beck and associates [43], it was reported that hopelessness was a strong predictor of future suicide, with ten out of eleven of eventual suicide completers (91%) in a sample of patients with suicidal ideation obtaining high scores on the Beck Hopelessness Scale. Only one completer (9%) had obtained less than the cutoff score (i.e., score of 9). Similar subsequent studies with psychiatric patient samples reported hopelessness to be as high as 90%–94.2% predictive of suicide [43,45]. Beck et al. [45] suggested a sequence of events that eventually leads persons with hopelessness to attempt suicide. These persons misconstrue their experiences in negative ways and anticipate dire outcomes resulting from their problems. They are drawn to suicide as the only way out of their “unsolvable problems” (p.190).

Hope and Hopelessness

Theoretically, the hope construct (as in Snyder’s theory of hope) and the hopelessness construct (as in Beck’s theory of hopelessness) have different foundations as discussed above. Snyder’s hope construct is a goal-directed model with two cognitive components, agency and pathways, which are the “will” and the “ways” to goal achievement. On the other hand, Beck’s hopelessness construct is an overall negative expectation regarding the future without any consideration of specific goals or their pursuit. In this vein, hopelessness may be more related to the Optimism / Pessimism of Carver’s model [46–48], which are characterized by generalized outcome expectancies (which can be favorable / unfavorable expectations about the future). Snyder’s hope construct is not simply a positive future expectation (c.f. hopelessness as
negative future expectation), but also contains a mixture of outcome expectancies (i.e., a sense of agency) and one’s expectancies about whether or not one is able to influence the outcome (i.e., problem-solving abilities). Thus, the hope construct has additive value to the hopelessness construct and they together could serve as a new framework through which outcome variables (such as suicidal ideation in the present study) can be examined.

The concept of hope and hopelessness as two separate constructs is depicted in Fig 1. Instead of being opposite poles of one spectrum, hope and hopelessness have their own bipolar spectra. A person can have a raised sense of agency and problem-solving abilities (i.e., hope) on one spectrum, together with the presence of negative future-oriented thoughts (i.e., hopelessness) on the other. For example, Person A has seasonal affective disorder and he is now having its symptoms during the seasonal change. He oversleeps and overeats, and he has heightened pessimistic feelings about his future. However, along with hopelessness, Person A has some hope as determined by his past successful experiences of coping with seasonal affective disorder and his present attempts to make adjustment to his oversleeping and overeating behaviours and pessimistic thoughts. Indeed, the difference in temporal focus between the two constructs also provides a basis for individuals to have hope and hopelessness at the same time. Whereas hopelessness focuses on the anticipation of future experiences or consequences, hope focuses on past and present experiences of successful goal pursuit.

Other examples of individuals having hope and hopelessness at the same time may come from cancer patients who find ways to make sense out of everyday although they might experience pain, sorrow and sadness. Sullivan [32] did a review on literatures concerning hope and hopelessness at the end of life of these patients and discussed the dynamics of the two constructs during the dying process. He pointed out that hope was still possible at the end of life (a hopeless condition) with varieties of goal: for cure, for survival, for comfort, for dignity, for intimacy or for salvation. If one of the goals could not be met (e.g. hope for survival at the terminal stage of cancer), hope for other goals would emerge. Therefore, the challenge at the end of life may lie on “diversifying and redirecting hope”. The phenomenon of high hope and high hopelessness will be further discussed within the context of suicidal ideation in the following section.

Moderating Effect of Hope on Hopelessness and Suicidal Ideation

As hope and hopelessness are two separate constructs, they can interact with each other in four different combinations to result in either high or low likelihood of suicidal ideation as depicted in Fig 2. In particular, the effect of hope in buffering the likelihood of suicidal ideation is evident when individuals are at high levels of hopelessness (i.e., the individuals are at an increased likelihood of suicidal ideation). On the other hand, when the level of hopelessness is low (i.e.,
the individuals are not at an increased likelihood of suicidal ideation); hope only makes a small difference in the likelihood of suicidal ideation.

The moderating effect of hope on hopelessness and suicidal ideation can be explained by the buffering framework [10] in that a resilience factor (i.e., hope in the present study) interacts with a risk factor (i.e., hopelessness in the present study) to reduce the strength of the association between the risk factor and an outcome of suicidality (i.e., suicidal ideation in the present study). As discussed earlier, previous studies [34,43,45] have shown hopelessness to be strongly associated with suicidal ideation and behaviors. The contemporary view of hopelessness suggests that negative affects embodied by hopelessness may lead to the employment of maladaptive coping styles [49]. A maladaptive coping style, and thus unsuccessful coping with hopelessness, may in turn result in suicidal ideation. At the same time, hope with its equal emphasis on agency and pathways thinking may act on the coping process [50] to buffer individuals at substantial levels of hopelessness against the development of suicidal ideation, or reduce the negative impact of hopelessness on suicidal ideation.

According to Snyder’s theory of hope, suicidal ideation is a result of perceived goal blockage [51]. When a person fails to generate alternative pathways to achieve a blocked goal or formulate new attainable goals, suicidal ideation might arise. As an individual with high hope is better able to generate more strategies for coping with negative stressors, hope is likely to have a moderating effect on the relationship between hopelessness and suicidal ideation. In addition, as high-hope individuals have more goals and can generate more pathways to achieve them, they would be better able to redirect their goals when they encounter goal blockage in adversity. Therefore, hypothetically, under high levels of hopelessness, high-hope individuals would be more likely than low-hope individuals to engage in “re-goaling” and generate adaptive coping strategies to achieve new goals, thus rendering the relationship between hopelessness and
suicidal ideation among high-hope individuals comparatively weaker. Hence, high-hope individuals are less likely to develop suicidal ideation even when they are experiencing high levels of hopelessness because they can pursue other goals and rebound from their negative emotional state. Conversely, low-hope individuals who are at high levels of hopelessness are more likely to develop suicidal ideation because of the absence of hope in reducing the negative impact of hopelessness on suicidal ideation.

In summary, the present study made use of empirical data to examine the constructs of hope and hopelessness. It was hypothesized that hope and hopelessness are better fitted as two correlated but distinct factors than one single factor ($H_1$). A moderation model of hope buffering the relationship between hopelessness and suicidal ideation was also tested. It was hypothesized that the interaction between hope and hopelessness predicted decreased suicidal ideation ($H_2$).

**Methods**

Data was collected as part of a population-based household survey in a prevalence study conducted by the Hong Kong Jockey Club Centre for Suicide Research and Prevention of the University of Hong Kong. Ethics approval for the study was granted by the Research Ethics Committee of the Faculty of Social Sciences, the University of Hong Kong. The participants provided their written informed consent to participate in this study. Consent form covering the main points of the study were read to and signed by each participant. Confidentiality of the data was explained to each participant that the information would be used for research purposes only. The participants were informed their rights to terminate the interview survey at any time without any negative consequences. This consent procedure was approved by the Research Ethics Committee stated above.

Respondents were sampled from the Frame of Quarters maintained by the Census and Statistics Department of the Government of the Hong Kong Special Administrative Region. The Frame of Quarters is a complete and up-to-date registry of residential addresses in Hong Kong, which is useful for conducting population-based household surveys. Once a residential address was selected from the Frame of Quarters, a member of that household was randomly selected and invited to respond to the survey. The detailed procedures of the household survey have been reported previously [52–53].

**Participants**

Only local residents were eligible to participate in this study. Domestic helpers from overseas countries were excluded from the targeted population. Moreover, only those aged 20 years or above were included in the target population of this study because one of the measures, the Adult Suicidal Ideation Questionnaire (ASIQ [54]), was designed for respondents aged 20 years and above. Participants were being asked their past suicidal behavior and 30 respondents reported having suicide attempt(s) in the year preceding administration of the survey. The data of these respondents with suicide attempt in the year preceding administration of the survey were also included in the present study for they are the population of interest.

Using the above inclusion criteria, a total of 2106 samples were obtained. The response rate was about 62%. The characteristics of the participants (including age group, gender, marital status, employment status and highest educational qualification) are reported in Table 1. The age and gender distribution of our sample was similar to that of and thus representative of the population aged between 20 and 59 years in Hong Kong.
Three measures were adapted in the present study: the Hope Scale (Snyder et al. [18]); the Beck Hopelessness Scale (BHS [34]); and the Adult Suicidal Ideation Questionnaire (ASIQ [54]).

**Hope.** Hope was measured by the Hope Scale by Snyder et al. [18]. The Hope Scale is a 12-item, self-reported inventory designed to measure an individual’s level of trait hope (i.e., general or characteristic level of hope across different circumstances). It consists of two subscales: Agency and Pathways. One sample item in the Agency subscale is “I energetically pursue
my goals”, and one sample item in the Pathways subscale is “I can think of many ways to get out of a jam”. The original inventory for the Hope Scale [18] contains twelve items in which four items are distracters. For the sake of not making the questionnaire lengthy in the population-based survey, the four distracters were not administered in the present study. A 4-point Likert scale was used, from 1 (definitely false) to 4 (definitely true), with higher scores representing the higher levels of hope. Cronbach’s alpha values for the 12 items in the Hope Scale ranged from .74 to .84; the test-retest correlations ranged from .73 to .85 in different samples [18]. The Chinese version of the Hope Scale from previous studies [22–23] was used in the present investigation.

**Hopelessness.** Hopelessness was measured by the Beck Hopelessness Scale (BHS) by Beck et al. [34]. The BHS consists of 20 statements which measure one’s state of hopelessness in a theoretically-based three-factor structure: feeling about the future (affective component), loss of motivation (motivational component), and future expectations (cognitive component). The internal consistency of the scale has been validated in both clinical and community samples (e.g. KR-20 coefficient = .91 [6]; Cronbach’s \( \alpha = .87 \) [55]). The Chinese version of the BHS, translated and validated by Shek [56], was used in the present study. Instead of asking for binary responses (yes/no) as in the original BHS, which was considered to be a narrow response range [56], the Chinese Hopelessness Scale makes use of the 6-point Likert scale, from 1 (strongly disagree) to 6 (strongly agree). A higher score in the scale implies a higher level of state hopelessness. The Chinese Hopelessness Scale has also been reported to have good internal consistency (Cronbach’s \( \alpha = .85 \)) when used in a sample of Chinese college students [56].

**Suicidal ideation.** Suicidal ideation was measured by the Adult Suicidal Ideation Questionnaire (ASIQ) by Reynolds [54]. The ASIQ is a 25-item, self-reported measure of the severity of suicidal ideation in adults. The 7-point scale describes the frequency of the cognitive occurrence of suicidal ideation during the past month, ranging from 0 (never had the thought) to 6 (almost everyday). A higher score on the scale indicates a higher level of suicidal ideation. The psychometric properties of the ASIQ have been validated in college student samples [9] with good internal consistency (Cronbach’s \( \alpha = .97 \)) and test-retest reliability (\( r = .86 \)). A Chinese version of the ASIQ has been validated [57], and was used in the present study.

**Statistical Analyses**

Two major statistical analyses were conducted to test the two hypotheses in the present study. Confirmatory factor analysis was conducted using LISREL 8.8 to test the hypothesis that hope and hopelessness are better fitted as two correlated but distinct factors than one single factor. Several goodness-of-fit indices were reported: Chi-square goodness-of-fit test statistics, comparative fit index (CFI [58]), incremental fit indices of non-normed fit index (NNFI [59]), and residual based indices of root mean square error of approximation (RMSEA [60]). The following criteria were applied to determine the goodness-of-fit of factor structural models: CFI and NNFI values of 0.90 or greater [58,61], and RMSEA value smaller than 0.08 [62]. For model comparison, chi-square difference test was used to compare nested models; Akaike information criterion (AIC) and consistent Akaike information criterion (CAIC) were considered for non-nested model comparisons. AIC and CAIC measure the parsimonious fit that taking both the model fit and the number of parameter estimated into consideration. Smaller values of AIC and CAIC indicate the model fits better in compromising between the model fit and model complexity.

Negative binomial regression analyses were conducted using IBM SPSS Statistics 20 to test the hypothesis that hope is a moderator in the relationship between hopelessness and suicidal ideation, such that the interaction between hope and hopelessness predicted suicidal ideation.
As stated by Gardner, Mulvey, and Shaw [63], negative binomial regression should be used instead of ordinary least squares regression if one or more variables (suicidal ideation in this case) was highly skewed (skew = 6.54, SE = .06) in order to avoid the violation of the assumptions of ordinary least squares regression. It should be noted that positive skewness for suicidal ideation was expected for our data because suicidal ideation has a low base-rate of occurrence in the general population. Three negative binomial regression models were fitted to predict suicidal ideation. The first model had the main effect of hopelessness only, and hope was added as another main effect in the second model. The third model had an interaction term of hope and hopelessness in addition to the two main effects. Hope and hopelessness were centered and the interaction term of hope and hopelessness were calculated based on multiplying the centered values of hope and hopelessness in order to avoid possible problems with multi-collinearity. An increase in overall $\chi^2$ would indicate improved fit of the current model over the previous model. A significant increase in chi-square statistics by analysing the deviance of the negative binomial models would provide further evidence for improved fit over the previous model.

Results

Descriptive Statistics and Intercorrelations of Study Variables

The means, standard deviations, Cronbach’s alphas, and intercorrelations of all the study variables in the present study are presented in Table 2. The internal consistency of each of the scales in the present study was estimated using Cronbach’s alpha [64]. The Cronbach’s alphas for Hope Scale, Beck Hopelessness Scale, and ASIQ were .89, .88, and .97 respectively, which were all satisfactory according to the commonly accepted minimum value of .70 [65]. All study variables were significantly correlated in the expected direction. Hope was negatively correlated with hopelessness ($r = -.54, p < .001$) and suicidal ideation ($r = -.25, p < .001$). Also, hopelessness was positively correlated with suicidal ideation ($r = .27, p < .001$). On a related note, the correlations between sub-factors of hope and hopelessness only ranged from -.36 to -.52, indicating that only a variance of 13% to 27% was shared by these two constructs. With little variance in common, hope and hopelessness cannot be considered equivalent constructs.

Table 2. Means, Standard Deviations, Cronbach’s Alphas, and Intercorrelations of Study Variables.

| Measure                  | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1. Hope (HS\(^a\))      | .89\(^d\)|        |        |        |        |        |        |        |
| 2. Agency                | .94\(^a\)| .83\(^d\)|        |        |        |        |        |        |
| 3. Pathways              | .93\(^a\)| .74\(^a\)| .81\(^d\)|        |        |        |        |        |
| 4. Hopelessness (BHS\(^b\)) | - .55\(^a\)| - .55\(^a\)| - .47\(^a\)| .88\(^d\)|        |        |        |        |
| 5. Affective             | - .54\(^a\)| - .53\(^a\)| - .47\(^a\)| .78\(^a\)| .75\(^d\)|        |        |        |
| 6. Motivational          | - .43\(^a\)| - .43\(^a\)| - .38\(^a\)| .90\(^a\)| .53\(^a\)| .83\(^d\)|        |        |
| 7. Cognitive             | - .45\(^a\)| - .47\(^a\)| - .36\(^a\)| .85\(^a\)| .54\(^a\)| .67\(^a\)| .63\(^d\)|        |
| 8. Suicidal Ideation (ASIQ\(^c\)) | - .25\(^a\)| - .26\(^a\)| - .20\(^a\)| .28\(^a\)| .22\(^a\)| .24\(^a\)| .25\(^a\)| .97\(^d\)|

Mean: 24.81 12.10 12.71 54.15 15.51 20.13 18.54 4.37
SD: 4.35 2.38 2.28 14.08 4.67 6.96 4.83 11.55

\(^a\)HS = Hope Scale  
\(^b\)BHS = Beck Hopelessness Scale  
\(^c\)ASIQ = Adult Suicidal Ideation Questionnaire.  
\(^d\)Cronbach’s alphas are on diagonal.  
\(^e\)All correlations with $p < .001$.  

doi:10.1371/journal.pone.0130073.t002
Confirmatory Factor Analysis on the Constructs of Hope and Hopelessness

Confirmatory factor analysis was conducted to test whether hope and hopelessness fit better into a model as a single construct (manifested as two opposite directions of one construct) or two separate constructs (manifested as two distinct but correlated constructs). The factor structures of hope and hopelessness were tested. The two-factor model (Agency and Pathways), as proposed by the Hope Scale [18], provided a good fit to the data, \( \chi^2 (19, n = 2001) = 553.22, p < .001; \) CFI = .96; NNFI = .95. The three-factor model (Affective, Motivational and Cognitive components), as proposed by the Beck Hopelessness Scale [34], also provided a good fit to the data, \( \chi^2 (167, n = 1953) = 2317.71, p < .001; \) CFI = .94; NNFI = .94. Two sets of alternative measurement models which manifested different combinations between the construct of hope (8 items in total) and hopelessness (20 items in total) were proposed at first-order and second-order levels. The first set of measurement models evaluated was first-order factor models: a one-factor model and a two-factor model. The one-factor model assumes all 28 items (8 items from the Hope Scale and 20 items from the Beck Hopelessness Scale) reflect a single dimensional factor, while the two-factor model assumes that two correlated dimensions (Hope and Hopelessness) underlie the responses to the 28 items. The other set of measurement models being evaluated were second-order factor models: A single second-order factor model and a two-second-order factor model. The single second-order factor model is a higher-order model in which a single second-order factor (named as Future Oriented Cognition) underlies the covariation among the five first-order latent factors of hope (Agency and Pathways) and hopelessness (Affective, Motivational and Cognitive components). The two second-order factor model is a higher-order model consisting of two negatively correlated second-order factors (Hope and Hopelessness). The first of these underlies the covariation between the first-order factors (Agency and Pathways), and the second underlies the covariation between the first-order factors (Affective, Motivational and Cognitive components).

**First-order factor models.** The one-factor model provided a poor goodness-of-fit to the combined data on hope and hopelessness, \( \chi^2 (350, n = 1941) = 14172.30, p < .001; \) CFI = .89; NNFI = .88; RMSEA = .14; Model AIC = 14284.30; Model CAIC = 14652.27. The two-factor model fitted the combined data much better, \( \chi^2 (349, n = 1941) = 6191.10, p < .001; \) CFI = .94; NNFI = .93; RMSEA = .09; Model AIC = 6305.10; Model CAIC = 6679.64, than the one-factor model (\( \Delta \chi^2 (1, n = 1941) = 7981.20, p < .001 \)).

**Second-order factor models.** The single second-order factor model provided an acceptable goodness-of-fit to the hope and hopelessness data, \( \chi^2 (345, n = 1941) = 4686.37, p < .001; \) CFI = .94; NNFI = .94; RMSEA = .08; Model AIC = 4808.37; Model CAIC = 5209.20, whereas the two-second-order factor model (Hope and Hopelessness) provided a better goodness-of-fit to the combined data than the one-second-order factor model, \( \chi^2 (344, n = 1941) = 3910.08, p < .001; \) CFI = .96; NNFI = .95; RMSEA = .07; Model AIC = 4034.08; Model CAIC = 4441.48. The improvement of fit of the two second-order factor model was statistically significant (\( \Delta \chi^2 (1, n = 1941) = 776.29, p < .001 \)). The two second-order factor model was thus taken as the best-fitted model of hope and hopelessness. The correlation between the two second-order factors was -.61 (\( p < .05 \)), which indicates that hope and hopelessness had a shared variance of about 37%. This is consistent with our hypothesis that hope and hopelessness fitted significantly better to the data as two distinct but correlated factors rather than one unidimensional factor in both first-order and second-order measurement models.
Negative Binomial Analyses with Hope as Moderator

Three negative binomial regression models were tested. Results of the negative binomial analyses are summarized in Table 3. The first model being tested had hopelessness as the single predictor of suicidal ideation, and the model was significant (Wald $\chi^2 (df = 1) = 610.32, p < .001$). Hopelessness was found to be positively correlated with suicidal ideation ($B = .041, SE = .002$; Wald $\chi^2 = 534.95, p < .001$). Hope was then entered in the second model with hopelessness, and the model was significant with a better model fit (Wald $\chi^2 (df = 2) = 725.36, p < .001$). Hope was found to be negatively correlated with suicidal ideation ($B = -.074, SE = .007$; Wald $\chi^2 = 108.74, p < .001$). Finally, the interaction term for hope and hopelessness was entered into the third model together with hope and hopelessness, and the model was significant with a better model fit (Wald $\chi^2 (df = 3) = 729.78, p < .001$). This shows that hope was a significant moderator for the effect of hopelessness on suicidal ideation.

The deviances of the three negative binomial regression models are shown in Table 4. Based on the deviance analysis, there is improved fit among the three over the previous models, $\Delta$deviance Model 1—Model 2 = 115.04, $p < .001$; $\Delta$deviance Model 3—Model 2 = 4.42, $p < .05$. Thus, the best model in predicting suicidal ideation is the model with two main effects (hope and hopelessness) and an interaction effect between hope and hopelessness. The interaction between variables is plotted in Fig 3. At low hope (1SD below the mean), the association between hopelessness and suicidal ideation was positive (simple slope = 0.028, $t = -7.05, p < .05$). At high hope (1SD above the mean), the association between hopelessness and suicidal ideation was smaller but still positive (simple slope = 0.027, $t = -6.55, p < .05$).

### Table 3. Negative Binomial Regression Analyses Predicting Suicidal Ideation.

| Model | $B$  | SE  | Wald $\chi^2$ |
|-------|------|-----|---------------|
| Model 1 ($df = 1$) | Hopelessness | .041 | .002 | 534.95$^a$ |
| Model 2 ($df = 2$) | Hopelessness | .028 | .002 | 178.41$^a$ |
| | Hope | -.074 | .007 | 108.74$^a$ |
| Model 3 ($df = 3$) | Hopelessness | .028 | .002 | 89.88$^a$ |
| | Hope | -.070 | .007 | 89.88$^a$ |
| | Hope × Hopelessness | -.001 | .0004 | 4.23$^b$ |

$^a p < .001$
$^b p < .05$

doi:10.1371/journal.pone.0130073.t003

### Table 4. Analysis of Deviance for Negative Binomial Analyses Predicting Suicidal Ideation.

| Model | deviance | df  | $\Delta$deviance | $\Delta$df | $\chi^2$ |
|-------|----------|-----|------------------|------------|----------|
| Model 1: Hopelessness | 4509.91 | 1931 | | | 115.04$^a$ |
| Model 2: Hopelessness + Hope | 4394.87 | 1930 | 115.04 | 1 | 115.04$^a$ |
| Model 3: Hopelessness + Hope + Hope × Hopelessness | 4390.45 | 1929 | 4.42 | 1 | 4.42$^b$ |

$^a p < .001$
$^b p < .05$

doi:10.1371/journal.pone.0130073.t004
Discussion

The present study contributed to the exploration of whether hope and hopelessness constitute a single bipolar construct or two distinct constructs. The empirical findings of the present study suggest that it would be more appropriate to conceive of hope and hopelessness as distinct but related constructs. Although the two constructs shared a portion of their variance (37%), the two second-order factor model (of hope and hopelessness) fitted significantly better to the combined data than the model collapsing the two constructs into a single factor, as hypothesized (H1). Moreover, it is noteworthy that the overall hopelessness correlated more strongly ($z = 3.36, p < .001$) with the agency component ($r = -.55$) than the pathways component ($r = -.46$) of hope. This observation supports our argument that the hope (esp. the pathways component emphasizing the cognitive process related to the pursuit of a goal as in Snyder’s theory of hope) is distinctive from hopelessness (which is a general negative expectation towards the future). Results consistent with this claim were also observed in the correlation between the pathways component of hope and the cognitive component of hopelessness ($r = -.36, p < .001$), which was lower than the other inter-factor correlations. Furthermore, this result is consistent with current findings that agency seems to be a more central component of hope than pathways [66].

It is intriguing that some people choose to end their lives under adversity, while others choose to take their hardships as a challenge and find meaning in their life despite high levels of hopelessness. Here, we propose that hope may be a key factor underlying an individual’s choice to persevere when facing adversity, and test the buffering effect of hope on the association between hopelessness and suicidal ideation using the buffering hypothesis for resilience factors [10]. As hypothesized (H2), the moderating effect of hope on the association between hopelessness and suicidal ideation was significant. From the interaction plot (see Fig 3), it can be observed that the level of hope moderates the relationship between hopelessness and suicidal ideation. Those scoring one standard deviation above the mean on hope (high-hope individuals) demonstrated a smaller relationship between hopelessness and suicidal ideation than those scoring one standard deviation below the mean (low-hope individuals). Therefore, hope (as a...
resilience factor) reduces the negative impact of hopelessness (as a risk factor) on suicidal ideation and buffers individuals against the development of suicidal ideation in the face of hopelessness.

Although there is extensive evidence supporting the relationship between hopelessness and suicidality [43,45], hopelessness may not develop into suicidal ideation if hope is present. Although high-hope individuals may feel depressed, they are likely to rebound from the state of hopelessness when confronting adversity by formulating new goals or redirecting their goals; they may interpret goal blockage as a challenge and seek alternative pathways to re-channel their motivation toward achieving their goals. Conversely, goal blockage in adversity could be disastrous to low-hope individuals as they might fail to generate new goals or find alternative ways to achieve their goals. They may feel hopeless in such a situation and perceive suicide as the only way out, thus resulting in suicidal ideation.

The clarification of hope and hopelessness as separate dimensions, with hope being a resilience factor which can buffer the strength of the association between a risk factor (e.g. hopelessness in the present study) and suicidality (e.g. suicidal ideation in the present study), has implications in future research and interventions in practice. Research in suicidality has mainly focused on identifying risk factors and populations at high risk for suicide. Positive psychological constructs, such as hope, have been largely neglected in the field [67]. In fact, hope is a well-researched construct in other disciplines like sociology and religion. For instance, Stack and Kposowa [68] proposed that a belief in an afterlife of some religions is fundamental to promoting human hopefulness which may lead to lower suicidality. Although the sociological perspective of hope in Stack and Kposowa’s study [68] and our present study are vastly different, the differences and similarities of the construct of hope in different disciplines could be investigated in future.

The findings of the present study suggest that hope can moderate the association between hopelessness and suicidal ideation, and that by instilling and strengthening hope we may be able to lower the risk of suicide. Hope can be further contributed to the design of interventions utilizing the public health approach [69] by using the concept of hope to facilitate the early prevention of suicide and to benefit other public health (e.g., mental health) and social phenomena (e.g., poverty). As stated by Snyder [40], hope theory has the potential for large-scale application and can be used to reduce the risk of, and inoculate segments of society against despair. If community-based prevention programmes involving the promotion of hope are developed, they may help reduce the population at risk. Apart from promoting hope as an early intervention, hope may also be applied in providing timely intervention for those who are at high risk. Pompli [70] called for focusing suicide as a phenomenon affecting unique individuals with unique motives for the suicidal act, and from this we add that the uniqueness of individuals’ level of hope and hopelessness may contribute to the understanding for the phenomenology of suicide and thus clinicians or helpers need to understand patients’ level of hope and hopelessness when working with suicidal individuals. Research has shown that the instillation of positive psychological constructs such as hope [25] and optimism [48,71] in psychotherapy may also be effective for high-risk groups, including suicide attempters and survivors in suicide prevention programmes as well as in depressive patients. Hope training in the form of cognitive behavioral therapy (CBT) which involves the generation of agency and the provision of new pathways to those of high-risk for suicide or depression may be effective in reducing the risk of suicidal intent and depressive symptoms.

The present study has several limitations which need to be considered when generalizing the findings. Firstly, all the variables in present study, including the measures of suicidal ideation (ASIQ), were self-reported. Items of the ASIQ were included in a self-completion questionnaire in order to protect privacy. Secondly, the response rate of the study was only 62%.
However, this is not dissatisfactory, as other population-based surveys conducted in Hong Kong on relatively less sensitive topics also obtained similar response rates [72]. Thirdly, the target sample only included individuals aged between 20 and 59 years on account of the design of the ASIQ. Thus, the results of the present study may not be generalizable to other age groups. Future studies should investigate whether the moderating effect of hope on hopelessness and suicidal ideation is also present in samples of the young and elderly. In addition, the study is limited as it utilized a cross-sectional design to investigate correlations, which cannot be used to demonstrate the causal effect of hope in reducing hopelessness and suicidal ideation. Although strict experimental control may not be feasible, future studies should use an experimental approach to examine the effect of different levels of hope on hopelessness and suicidal ideation. For example, one of the authors is conducting a study on examining whether reading a hopeful story enhances a person’s hope, and thus leads to a decrease in hopelessness by priming.

It is important to distinguish and clarify the constructs of hope and hopelessness, that they may be distinct constructs rather than simple correlates or polar opposites of future expectation. Researchers and clinicians need to realize the negative-type constructs are not simply polar opposites of positive-type constructs, that two entities must be considered as unique groups of variables. This is important to the development of the field of positive psychology, as well as the future implication on using positive psychological factors in buffering against negative outcomes.

Conclusion

In this study, we have explored the constructs of hope and hopelessness using empirical data. Our results have shown that a two second-order factors model of hope and hopelessness fitted better than a single second-order factor combining hope and hopelessness into a single construct. Thus, the results suggested that hope and hopelessness are two distinct but correlated constructs. Hope was further examined as a resilience factor as outlined by the buffering framework. It was found that hope could moderate the negative impact of hopelessness on suicidal ideation. Future research and interventions in practice may act on hope as a resilience factor to study or reduce the negative impacts of suicidality.

Author Contributions

Conceived and designed the experiments: JMYH BYTI SMYH PSFY. Performed the experiments: JMYH BYTI SMYH PSFY. Analyzed the data: JMYH BYTI SMYH PSFY. Contributed reagents/materials/analysis tools: JMYH BYTI SMYH PSFY. Wrote the paper: JMYH BYTI SMYH PSFY.

References

1. Dieserud G, Roysamb E, Ekeberg O, Kraft P. Toward an integrative model of suicide attempt: A cognitive psychological approach. Suicide and Life-Threatening Behavior. 2001; 31: 153–168. PMID: 11459248
2. Dixon WA, Heppner PP, Rudd MD. Problem-solving appraisal, hopelessness, and suicide ideation: Evidence for a mediational model. Journal of Counseling Psychology. 1994; 41: 91–98.
3. Heisel MJ, Flett GL, Besser A. Cognitive functioning and geriatric suicide ideation: Testing a mediational model. The American Journal of Geriatric Psychiatry. 2002; 10: 428–436. PMID: 12095902
4. Konick LC, Gutierrez PM. Testing a model of suicide ideation in college students. Suicide and Life-Threatening Behavior. 2005; 35: 181–192. PMID: 15843335
5. Williams JMG, Pollock LR. The psychology of suicidal behaviour. In: Hawton K, Heeringen KV, editors. The international handbook of suicide and attempted suicide. New York: Wiley; 2000. pp. 79–93.
6. Beck AT, Steer RA, Beck JS, Newman CF. Hopelessness, depression, suicidal ideation, and clinical diagnosis of depression. Suicide and Life-Threatening Behavior. 1993; 23: 139–145. PMID: 8342213

7. Kashani JH, Reid JC, Rosenberg TK. Levels of hopelessness in children and adolescents: A developmental perspective. Journal of Consulting and Clinical Psychology. 1989; 57: 496–499. PMID: 2768609

8. Kuo WH, Gallo JJ, Eaton WW. Hopelessness, depression, substance disorder, and suicidality: A 13-year community-based study. Social Psychiatry and Psychiatric Epidemiology. 2004; 39: 497–501. PMID: 15205735

9. Niederkrotenthaler T, Voracek M, Herberth A, Till B, Strauss M, Etzersdorfer E, et al. Role of media reports in completed and prevented suicide: Werther v. Papageno effects. The British Journal of Psychiatry. 2010; 197: 234–243. doi:10.1192/bjp.bp.109.074633 PMID: 20807970

10. Johnson J, Wood AM, Gooding P, Taylor PJ, Tarrier N. Resilience to suicidality: The buffering hypothesis. Clinical Psychology Review. 2011; 31: 563–591. doi: 10.1016/j.cpr.2010.12.007 PMID: 21276646

11. Lazarus RS. Does the positive psychology movement have legs? Psychological Inquiry. 2003; 14: 93–109.

12. Seligman MEP. Positive psychology, positive prevention, and positive therapy. In: Snyder CR, Lopez SJ, editors. Handbook of positive psychology. New York: Oxford University Press; 2002. pp. 3–9.

13. Wingate LR, Burns AB, Gordon KH, Perez M, Walker RL, Williams FM, et al. Suicide and positive cognitions: Positive psychology applied to the understanding and treatment of suicidal behavior. In: Ellis TE, editor. Cognition and suicide: Theory, research and therapy. Washington: American Psychological Association; 2006. pp. 261–283.

14. Rutter PA, Freudenthal S, Osman A. Assessing protection from suicidal risk: Psychometric properties of the Suicide Resilience Inventory. Death Studies. 2008; 32: 142–153. doi: 10.1080/07481180701801295 PMID: 18693384

15. Kleiman EM, Adams LM, Kashdan TB, Riskind JH. Gratitude and grit indirectly reduce risk of suicidal ideations by enhancing meaning in life: Evidence for a mediated moderation model. Journal of Research in Personality. 2013; 47: 539–546.

16. Kleiman EM, Adams LM, Kashdan TB, Riskind JH. Grateful individuals are not suicidal: Buffering risks associated with hopelessness and depressive symptoms. Personality and Individual Differences. 2013; 55: 595–599.

17. Duckworth AL, Peterson C, Matthews MD, Kelly DR. Grit: Perseverance and passion for long-term goals. Journal of Personality and Social Psychology. 2007; 92: 1087–1101. PMID: 17547490

18. Snyder CR, Harris C, Anderson JR, Holleran SA, Irving LM, Sigmon ST, et al. The will and the ways: Development and validation of an individual-differences measure of hope. Journal of Personality and Social Psychology. 1991; 60: 570–585. PMID: 2037968

19. Erickson RC, Post RD, Paige AB. Hope as a psychiatric variable. Journal of Clinical Psychology. 1975; 31: 324–330. PMID: 1133202

20. Frank J. The role of hope in psychotherapy. International Journal of Psychiatry. 1968; 5: 383–395. PMID: 5659469

21. Gottschalk LA. A hope scale applicable to verbal samples. Archives of General Psychiatry. 1974; 30: 779–785. PMID: 483218

22. Ho SMY, Ho JWC, Bonanno GA, Chu ATW, Chan EMS. Hopefulness predicts resilience after hereditary colorectal cancer genetic testing: A prospective outcome trajectories study. BMC Cancer. 2010; 10: 279. doi:10.1186/1471-2407-10-279 PMID: 20537192

23. Ho S, Rajandram RK, Chan N, Samman N, McGrath C, Zwahlen RA. The roles of hope and optimism on posttraumatic growth in oral cavity cancer patients. Oral Oncology. 2011; 47: 121–124. doi: 10.1016/j.oraloncology.2010.11.015 PMID: 21183398

24. Magaletta PR, Oliver JM. The hope construct, will, and ways: Their relations with self-efficacy, optimism, and general well-being. Journal of Clinical Psychology. 1999; 55: 539–551. PMID: 10392785

25. Snyder CR, Taylor JD. Hope as a common factor across psychotherapy approaches: A lesson from the Dodo’s Verdict. In: Snyder CR, editor. Handbook of hope: Theory, measures, and applications. San Diego: Academic; 2000. pp. 89–108.

26. Yuen ANY, Ho SMY, Chan CKY. The mediating roles of cancer-related rumination in the relationship between dispositional hope and psychological outcomes among childhood cancer survivors. Psycho-Oncology. 2014; 23: 412–419. doi: 10.1002/pon.3433 PMID: 24307197

27. Davidson CL, Wingate LR, Rasmussen KA, Slish ML. Hope as a predictor of interpersonal suicide risk. Suicide and Life-Threatening Behavior. 2009; 39: 499–507. doi: 10.1521/suli.2009.39.5.499 PMID: 19929150
28. Davidson CL, Wingate LR, Slish ML, Rasmussen KA. The great black hope: Hope and its relation to suicide risk among African Americans. Suicide and Life-Threatening Behavior. 2009; 40: 170–180.

29. Anestis MD, Moberg FB, Arnau RC. Hope and the interpersonal-psychological theory of suicidal behaviour: Replication and extension of prior findings. Suicide and Life-Threatening Behavior. 2014; 44: 175–187. doi: 10.1111/sltb.12060 PMID: 24237390

30. Herth K. Development and refinement of an instrument to measure hope. Scholarly Inquiry for Nursing Practice. 1991; 5: 39–51. PMID: 2063043

31. Mehler JA, Argentieri S. Hope and hopelessness: A technical problem? The International Journal of Psychoanalysis. 1989; 70: 295–304.

32. Sullivan MD. Hope and hopelessness at the end of life. The American Journal of Geriatric Psychiatry. 2003; 11: 393–405. PMID: 12837668

33. Waterworth JM. A philosophical analysis of hope. New York: Palgrave Macmillan; 2004.

34. Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: The Hopelessness Scale. Journal of Consulting and Clinical Psychology. 1974; 42: 861–865. PMID: 4436473

35. Stotland E. The psychology of hope. San Francisco: Jossey-Bass; 1969.

36. Farran CJ, Herth KA, Popovich JM. Hope and hopelessness: Critical clinical constructs. Thousand Oaks: Sage Publications; 1995.

37. Grewal PK, Porter JE. Hope theory: A framework for understanding suicidal action. Death Studies. 2007; 31: 131–154. PMID: 17410693

38. MacLeod AK, Rose GS, Williams JMG. Components of hopelessness about the future in parasuicide. Cognitive Therapy and Research. 1993; 17: 441–455.

39. Snyder CR. Hypothesis: There is hope. In: Snyder CR, editor. Handbook of hope: Theory, measures, & applications. San Diego: Academic; 2000. pp. 3–21.

40. Snyder CR. Hope theory: Rainbows in the mind. Psychological Inquiry. 2002; 13: 249–275.

41. Lopez SJ, Floyd RK, Ulven JC, Snyder CR. Hope therapy: Helping clients build a house of hope. In: Snyder CR, editor. Handbook of hope: Theory, measures, & applications. San Diego: Academic; 2000. pp. 123–150.

42. Beck AT, Kovacs M, Weissman A. Hopelessness and suicidal behavior: An overview. Journal of the American Medical Association. 1975; 234: 1146–1149. PMID: 1242427

43. Beck AT, Brown G, Steer RA. Prediction of eventual suicide in psychiatric inpatients by clinical ratings of hopelessness. Journal of Consulting and Clinical Psychology. 1989; 57: 309–310. PMID: 2708621

44. Brown GK, Beck AT, Steer RA, Grisham JR. Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. Journal of Consulting and Clinical Psychology. 2000; 68: 371–377. PMID: 10883553

45. Beck AT, Brown G, Berchick RJ, Stewart BL, Steer RA. Relationship between hopelessness and ultimate suicide: A replication with psychiatric outpatients. The American Journal of Psychiatry. 1990; 147: 190–195. PMID: 2278535

46. Carver CS, Scheier MF, Segerstrom SC. Optimism. Clinical Psychology Review. 2010; 30: 879–889. doi: 10.1016/j.cpr.2010.01.006 PMID: 20170998

47. Scheier MF, Carver CS. Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. Health Psychology. 1985; 4: 219–247. PMID: 4029106

48. Scheier MF, Carver CS, Bridges MW. Optimism, pessimism, and psychological well-being. In: Chang EC, editor. Optimism and pessimism: Implications for theory, research, and practice. Washington: American Psychological Association; 2001. pp. 189–216.

49. Henry P. Hope, hopelessness, and coping: A framework for class-distinctive cognitive capital. Psychology and Marketing. 2004; 21: 375–403.

50. Snyder CR, Cheavens J, Michael ST. Hoping. In: Snyder CR, editor. Coping: The psychology of what works. New York: Oxford University Press; 1999. pp. 205–231.

51. Moon C, Snyder CR. Hope and the journey with AIDS. In: Snyder CR, editor. Handbook of hope: Theory, measures, & applications. San Diego: Academic; 2000. pp. 341–353.

52. Cheung YB, Law CK, Chan B, Liu KY, Yip PSF. Suicidal ideation and suicidal attempts in a population-based study of Chinese people: Risk attributable to hopelessness, depression, and social factors. Journal of Affective Disorders. 2006; 90: 193–199. PMID: 16406046

53. Liu KY, Chen EYH, Chan CLW, Lee DTS, Law YW, Conwell Y, et al. Socio-economic and psychological correlates of suicidality among Hong Kong working-age adults: Results from a population-based survey. Psychological Medicine. 2006; 36: 1759–1767. PMID: 17129396
54. Reynolds W. Adult Suicidal Ideation Questionnaire: Professional manual. Odessa: Psychological
Assessment Resources; 1991.
55. Haatainen K, Tanskanen A, Kylma J, Honkalampi K, Koivumaa-Honkanen H, Hintikka J, et al.
Factors associated with hopelessness: A population study. International Journal of Social Psychiatry.
2004; 50: 142–152. PMID: 15293431
56. Shek DTL. Measurement of pessimism in Chinese adolescents: The Chinese Hopelessness Scale.
Social Behavior and Personality. 1993; 21: 107–120.
57. Fu KW, Liu KY, Yip PSF. Predictive validity of the Chinese version of the Adult Suicidal Ideation
Questionnaire: Psychometric properties and its short version. Psychological Assessment. 2007; 19: 422–
429. PMID: 18085934
58. Bentler PM. Comparative fit indexes in structural models. Psychological Bulletin. 1990; 107: 238–246.
PMID: 2320703
59. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures.
Psychological Bulletin. 1980; 88: 588–606.
60. Steiger JH, Lind JC. Statistically-based tests for the number of common factors. Conference Paper,
Psychometric Society. 1980.
61. Jöreskog KG, Sörbom D. LISREL 8: A guide to the program and applications. Chicago: Scientific Soft-
ware; 1993.
62. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, editors. Test-
ing Structural Equation Models. Newbury Park: Sage; 1993. pp. 136–162.
63. Gardner W, Mulvey EP, Shaw EC. Regression analyses of counts and rates: Poisson, overdispersed
Poisson, and negative binomial models. Psychological Bulletin. 1995; 118: 392–404. PMID: 7501743
64. Cronbach LJ. Coefficient alpha and internal structure of tests. Psychometrika. 1951; 16: 297–334.
65. Nunnally JC, Bernstein IH. Psychometric theory. 3rd ed. New York: McGraw-Hill; 1994.
66. Tong EMW, Fredrickson BL, Chang W, Lim ZX. Re-examining hope: The roles of agency thinking and
pathways thinking. Cognition and Emotion. 2010; 24: 1207–1215.
67. Scioli A, Ricci M, Nyugen T, Scioli ER. Hope: Its nature and measurement. Psychology of Religion and
Spirituality. 2011; 3: 78–97.
68. Stack S, Kposowa AJ. Religion and suicide acceptability: A cross-national analysis. Journal for the Sci-
entific Study of Religion. 2011; 50: 289–306. PMID: 21969937
69. Yip PSF, Huen JMY, Lai ESY. Mental health promotion: Challenges, opportunities, and future direc-
tions. Hong Kong Journal of Mental Health. 2012; 38: 5–14.
70. Pompili M. Exploring the phenomenology of suicide. Suicide and Life-Threatening Behavior. 2010; 40:
234–244. doi: 10.1521/suli.2010.40.3.234 PMID: 20560745
71. Seligman MEP. Learned optimism. New York: Knopf; 1991.
72. Lau SK, Lee MK, Wan PS, Wong SL. Indicators of social development: Hong Kong 1993. Hong Kong:
Hong Kong Institute of Asia Pacific Studies; 1995.