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# A brief screening tool for suicidal symptoms in adolescents and young adults in general health settings: reliability and validity data from the Australian National General Practice Youth Suicide Prevention Project

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## Abstract

Using data from a nationwide project on young people in Australia aimed at assessing suicidality in general health settings, we present a brief screening tool for suicidality (the depressive symptom index suicidality subscale). Two thousand eight hundred and fifty-one (15–24 year old) patients presenting to 247 Australian general practitioners between 1996 and 1998 were assessed. In addition to the suicide screen, patients completed the general health questionnaire-12 and the Center for Epidemiological Studies depression scale. Patients' chief complaints were taken from the summary sheets completed by their general practitioners. Using inter-item correlational and factor-analytic techniques, as well as a general approach to construct validity, we show that the measure has favorable reliability and validity characteristics. We also provide results on cut-points that may facilitate its use in clinical and research settings. Because the screen is brief, easy to use, reliable, and valid, we encourage its use to combat the vexing international health problem of suicide. © 2002 Elsevier Science Ltd. All rights reserved.

*Keywords:* Screening tool; Suicidal symptoms; Adolescents and young adults; General health settings

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In context of international concern about youth suicide (e.g. Diekstra & Gulbinat, 1993), reliable, valid, and efficient ways of screening for youth suicidality, particularly in general settings, are needed. Of course, several suicide assessment approaches are available (e.g. Joiner, Walker,

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Rudd & Jobes, 1999; Stoelb & Chiriboga, 1998), including capably developed rating scales (e.g. Beck scale for suicide ideation; see Steer, Kumar & Beck, 1993). But to our knowledge, no currently available approach possesses the features of very brief application combined with demonstrated reliability and validity among a general population of adolescents and young adults. The purpose of this paper is to present one such approach.

Suicidal ideation is relatively common among adolescents, with 6-month prevalence estimates as high as 24% (Zubrick et al., 1995), and lifetime rates among 21-year olds of at least 29% (Fergusson, Woodward & Horwood, 2000). Of course, suicidal ideation may signify considerable morbidity (e.g. mood and personality disorders; self-injury), and represents a risk for mortality via suicide (Joiner et al., 1999). Although relatively common and pernicious, suicidality is not necessarily clinically obvious. Patients may harbor suicidal ideas that they do not report, and suicidal patients may present in general settings for non-suicidal, indeed non-psychological, reasons. This combination of difficult detection, relatively high prevalence, and associated morbidity and mortality points up the need for a good screening device. And a good screening device is one that is likely to be used in practice; thus the value of short and relatively straightforward approaches.

The suicidality subscale of the depressive symptom inventory has potential as a widely used screening device, in part because it is straightforward, easy to use, and brief. In this paper, we show that, in addition to being brief and straightforward, the measure possesses good reliability and validity characteristics, among approximately 2800 (15–24 year old) patients attending the clinics of Australian general practitioners. These data were gathered as part of a large-scale national study in Australia aimed at evaluating the effectiveness of training general practitioners in the recognition and treatment of young people at risk of suicide (the National General Practice Youth Suicide Prevention Project). Specifically, we present evidence in this paper that: (a) the scale's internal consistency and inter-item characteristics are adequate; and (b) the scale's pattern of associations with depressive symptoms, general emotional distress, age, type of presenting complaint, and gender, was as expected.

Regarding the scale's correlation with depressive symptoms and emotional distress, based on past work (e.g. Metalsky & Joiner, 1997), we expected a correlation between suicidality and depressive symptoms of approximately 0.60, and, insofar as suicidality characterizes the depressive syndrome more so than it does generalized emotional distress, we predicted that the correlation between suicidality and depressive symptoms would exceed that between suicidality and generalized emotional distress. Regarding the scale's correlation with age, we made no explicit prediction, because some studies have reported higher suicidality prevalence rates among the 20–24 year old age group than among the 15–19 year old age group (e.g. Mental Health Branch, Commonwealth Department of Health and Family Services, Australia, 1997), whereas others have not (Hintikka et al., 2000; Wichstrom, 2000). There is some evidence that, if there is a positive correlation between age and suicidality, it is stronger in males than females (e.g. Berman & Jobes, 1991, p. 19), and we will test this possibility in the present sample.

In addition, we expected that those with high suicidality scores would be more likely to present with psychological than with somatic complaints (although by no means do we suggest that high suicidality scores in context of a somatic complaint are rare). Finally, regarding the correlation between gender and suicidality, we made no firm prediction, because some studies have found that suicidality is more common among adolescent females than males (probably because depression is

more common among adolescent females than males), whereas other studies have found the reverse pattern (probably because aggression and risk-taking are more common among adolescent males than females; see Hintikka et al., 2000). One fairly clear finding, however, is that within adolescents with depressive symptoms, suicidality is somewhat more severe among adolescent boys than girls (cf. Blair-West, Cantor, Mellsop, & Eyeson-Annan, 1999); accordingly, we hypothesized that gender and depressive symptoms would interact to predict suicidality scores, such that the depression–suicidality correlation would be higher among males than females. Support for this series of hypotheses would comprise reasonable construct validity data for our brief suicidality measure.

## 1. Methods

### 1.1. Participants

The study population consisted of 2851 consecutive patients, aged 15–24 years, who fully completed the suicide screening measure at clinics of 247 general practitioners in the Australian States of Tasmania, Victoria, and Western Australia. Gender distribution was 66% female; mean age was 19.6 years. Ninety one percent (91%) of 15–24 year old patients presenting during the period of the study agreed to participate. Most patients were born in Australia (90.1%) with 3.9% born in Europe, 2.4% in Asia, and 1.1% in New Zealand. English was the most common language spoken in patients' homes with other European languages and Asian languages accounting for only 3.7 and 1.5%, respectively.

The general practitioners were voluntary participants in a nationwide Australian study evaluating the effectiveness of general practitioner training in the recognition and treatment of youth at risk of suicide. Participants consisted of those patients attending the general practitioners' clinics during a specified 6-week period. A maximum of 20 patients from each clinic was invited to participate. The ethics committee of Princess Margaret Hospital in Perth, Western Australia, approved the study.

### 1.2. Survey methods

Each participating clinic's nurse or receptionist offered patients awaiting consultations an envelope containing the study's materials. The envelope contained background information on the study, an informed consent document, the study's self-report instruments, and a return envelope. Participants' instructions were to read and, if they agreed to participate, to sign the informed consent document, complete the self-report questionnaires, seal all documents in the enclosed envelope, and return them to the nurse or receptionist. Study materials were then sent directly to the study's authors. At the time of the visit, general practitioners were not aware of which patients had elected to participate in the study and were not able to review patients' self-report questionnaires. Each general practitioner completed a summary sheet on all 15–24 year old patients attending his or her clinic during the study period. Among other things, the sheet asked for the patient's presenting complaint, which was coded for the purposes of this paper as either a psycho-

logical or a physical complaint. Study authors were thus able to directly match presenting complaint to patients' self-report measures, which are described next.

### 1.3. Instruments

Study instruments consisted of the suicide screening tool, which was the depressive symptom inventory — suicidality subscale (DSI-SS; see Appendix A, as well as Metalsky & Joiner, 1997), the general health questionnaire-12 (GHQ-12), and the Center for Epidemiological Studies depression scale (CES-D).

The DSI-SS is a 4-item self-report questionnaire designed to identify the frequency and intensity of suicidal ideation and impulses in the past two weeks. It is reproduced in Appendix A, and was developed by Metalsky and Joiner (1997) as part of a larger depressive symptom index called the Hopelessness Depression Symptom Questionnaire. Scores on each item range from 0 to 3 and, for the inventory, from 0 to 12, with higher scores reflecting greater severity of suicidal ideation. Some preliminary data have supported the scale's internal consistency and validity (Joiner & Rudd, 1995; Joiner & Rudd, 1996). Of course, the main purpose of the present study is to add to these preliminary data on the scale's characteristics (see Section 2).

The GHQ-12 is a 12-item self-report questionnaire designed to identify those patients awaiting general practitioner consultations who may require further evaluation due to generalized emotional distress (Goldberg, 1972). Scores range from 0 to 12, with higher scores representing more distress. The scale has accrued reasonable reliability and validity data; in the current sample, coefficient alpha was 0.90.

The CES-D is a 20-item questionnaire developed for use in the epidemiological surveys to identify persons with depressive symptoms (Radloff, 1977). Its scores range from 0 to 60, with higher scores reflecting more depressive symptoms. The scale has been widely used in epidemiological surveys, with demonstrated reliability and validity. Coefficient alpha in the current sample was 0.92.

## 2. Results

### 2.1. Inter-item characteristics and internal consistency of the suicide screen

Table 1 displays the inter-item correlations of the four items from the DSI-SS suicide screen, as well as corrected item-total correlations. As can be seen there, all inter-item correlations were

Table 1

Inter-item correlations and corrected item-total correlations (on diagonal) of suicidality subscale of the depressive symptom index (refer to Appendix A for item content; inter-item correlations are below the diagonal (all highly significant); corrected item-total correlations are on the diagonal)

	Item A	Item B	Item C	Item D
Item A	0.77			
Item B	0.70	0.82		
Item C	0.74	0.82	0.85	
Item D	0.64	0.65	0.67	0.71

high, and all item-total correlations far exceeded the guidelines provided by Nunnally and Bernstein (1994) that an item be considered “weak” if it has a corrected item-total correlation  $<0.30$ . Accordingly, it is no surprise that coefficient alpha for the DSI-SS was quite acceptable (alpha=0.90). The acceptable coefficient alpha appears *not* to be merely a function of the large preponderance of participants who endorsed “0” for the DSI-SS items; among those who scored “1” or higher on the first DSI-SS item (and who thus endorsed at least some suicidality), coefficient alpha was 0.77 — still adequate.

In addition to item-total correlations, a factor analysis was conducted on the four DSI-SS items, using a common factor analysis (i.e. principal axis factoring (PAF)). Again, as is no surprise given Table 1 results, one large factor emerged (the eigenvalue was 10 times that of the next eigenvalue), on which all four items loaded strongly (all loadings  $>0.75$ ). It appears that the four items of the screen comprise a cohesive, internally consistent scale.

## 2.2. Construct validity data

We turn to the scale’s pattern of associations with depressive symptoms, general emotional distress, age, type of presenting complaint, and gender, for support for the scale’s construct validity. In each of the domains listed below, we made specific predictions, support for which would provide reasonable construct validity data.

### 2.3. Relation between suicidality and depressive symptoms.

Based on the past work, we expected a correlation between suicidality and depressive symptoms of approximately 0.60. In fact, the correlation between CES-D depressive symptoms and DSI-SS in this sample was *exactly* 0.60 ( $p<0.0001$ ).

### 2.4. The relation between suicidality and depressive symptoms as exceeding that between suicidality and general distress

We predicted that the CES-D–DSI-SS correlation would exceed the correlation between DSI-SS and general emotional distress, as indexed by the GHQ. As was reported earlier, the CES-D–DSI-SS correlation was 0.60. The correlation between DSI-SS and GHQ was 0.49 ( $p<0.0001$ ). The *t*-test for difference between dependent correlations indicated that the former correlation was significantly higher than the latter ( $t(2848)=9.90$ ,  $p<0.0001$ ), consistent with prediction.

### 2.5. Relation between suicidality and age

Past work has produced mixed results on the association between suicidality and age in the 15–24 year old age group. In the current sample, the age–suicidality correlation was  $-0.05$ ,  $p<0.05$ , indicating that there was a very slight tendency for younger patients to report higher scores on the DSI-SS suicidality measure. To determine whether this correlation varied by gender (recall that past work indicates that if there is a positive correlation between age and suicidality, it is stronger in males than females), we examined whether age and gender interacted to predict DSI-SS suicidality scores. In fact, the age $\times$ gender interaction was significantly related to DSI-SS

scores (partial correlation =  $-0.06$ ,  $t(2823) = -3.01$ ,  $p < 0.01$ ; degrees of freedom are lower than expected because of missing data on sex and age variables). Follow-up analyses demonstrated that, among males, there was a positive, but non-significant, correlation between age and suicidality ( $r = 0.03$ ;  $p = \text{ns}$ ), whereas among females, the age–suicidality correlation was  $-0.09$ ,  $p < 0.001$ . The correlations of  $-0.09$  in women and  $0.03$  in men differ to a statistically significant degree ( $z = 3.08$ ,  $p < 0.05$ ). Our findings thus converge with others in showing that the age–suicidality correlation differs in males and females.

## 2.6. Relation between suicidality and presenting complaint

We hypothesized that a variable reflecting presenting complaint (1 = physical complaint; 2 = psychological complaint) would be positively correlated with the suicidality measure, as would be expected for any valid measure of psychopathological symptoms. This correlation was  $0.27$ ,  $p < 0.0001$ , consistent with our expectations.

## 2.7. Relation between suicidality and gender

Insofar as past research has found a variable relation between gender and suicidality, we made no firm predictions about this correlation. Interestingly, gender (coded as 1 = male; 2 = female) was unrelated to suicidality ( $r = 0.01$ ;  $p = \text{ns}$ ). However, we made a clear prediction that, within 15–24 year olds with depressive symptoms, suicidality would be somewhat more severe among males than females. To test this prediction, we examined the interaction of gender and depressive symptoms in prediction of suicidality scores. If, in fact, suicidality is somewhat more severe among males than females, this interaction term should emerge as a significant predictor of DSI-SS suicidality scores; moreover, the partial correlation between the interaction term and suicidality scores should be negative, reflecting that the correlation between depressive symptoms and DSI-SS is *highest* among those with the *lowest* scores on the gender variable (which was coded as 1 = male; 2 = female). This was indeed the case (partial correlation for the interaction term =  $-0.05$ ;  $t(2631) = -2.51$ ;  $p < 0.05$ ; degrees of freedom are lower than expected because of missing data on sex and CES-D variables). Among those who scored in the top quartile of the CES-D depression measure, gender and DSI-SS suicidality scores were correlated ( $r = -0.10$ ;  $p < 0.05$ ), such that males tended to report slightly more suicidality than females. By contrast, among the rest of the sample, gender and DSI-SS suicidality scores were unrelated ( $r = -0.02$ ;  $p = \text{ns}$ ), consistent with prediction.

## 2.8. Distribution of DSI-SS suicidality scores in a general sample of adolescents and young adults

In many clinical settings, there is a desire for cut-scores (i.e. the threshold at or above which one is deemed to be positive for a symptom or disorder). Table 2 provides the frequency distribution for the entire sample, so that clinicians and researchers can make their own judgments about cut-points. The table also includes the means and standard deviations of the CES-D and the GHQ per each DSI-SS score, which may assist in such judgments. The DSI-SS mean for the overall sample was  $0.79$  ( $SD = 1.65$ ).

Table 2  
Distribution of DSI-SS suicidality scores in a general sample of adolescents and young adults

DSI-SS score	Frequency	Percent	CES-D mean (SD)	GHQ mean (SD)
0	2103	73.8	11.86 (9.40)	1.94 (2.91)
1	232	8.1	20.75 (10.66)	3.81 (3.49)
2	97	3.4	24.48 (11.91)	4.39 (3.68)
3	138	4.8	28.27 (10.94)	5.99 (3.86)
4	133	4.7	29.93 (11.27)	6.59 (4.68)
5	70	2.5	34.13 (10.62)	7.13 (3.50)
6	44	1.5	41.24 (8.24)	8.62 (3.33)
7	16	0.6	40.00 (12.65)	9.07 (3.06)
8	9	0.3	40.11 (10.20)	8.89 (3.66)
9	5	0.2	43.67 (9.61)	8.00 (4.53)
10	3	0.1	49.67 (4.73)	10.67 (1.15)
11	0	0	–	–
12	1	0.005	48.00 (–)	12.00 (–)
Total	2851	100	16.06 (12.43)	2.91 (3.65)

One could suggest that any DSI-SS score above 0 warrants further investigation. While we sympathize with this view, it is also important to recognize that more than one in four patients will achieve such scores, and that the mean CES-D and GHQ scores among those who score 1 are not particularly elevated. Other possibilities would include a score of 2 or above (which would designate approximately 20% of the sample as symptomatic); 3 or above (which would designate approximately 15% of the sample as symptomatic); and 4 or above (which would designate approximately 10% of the sample as symptomatic). Although local adjustments should be made according to clinicians' and researchers' needs, we find the cut-point of 3 and above appealing, in that it is relatively selective (1 or 2 in 10 patients will achieve this score or higher), and those who obtain a DSI-SS score of 3 obtain mean CES-D and GHQ scores that are clearly elevated (e.g. for CES-D, a standard deviation above the sample-wide mean).

### 3. Discussion

We presented the suicidality subscale of the depressive symptom index (see Appendix A, as well as Metalsky & Joiner, 1997) as a brief screening tool for suicidality in young people in general health settings. Results regarding the measure, from approximately 2800 Australian adolescents and young adults, were favorable. Specifically, the scale was clearly unitary, cohesive, and internally consistent. Moreover, it evinced construct validity by relating to several demographic and clinical indices in predicted ways. For example, the scale was highly related to depressive symptoms (in fact, our expectation that this correlation would be approximately 0.60 happened to be extremely accurate!) and to general emotional distress, and as predicted, was more related to the former than to the latter. Also as expected, the scale correlated with a variable reflecting whether patients' presenting complaints were psychological versus physical.

The predictions and results involving age and gender were somewhat more complex, but here,

too, findings largely conformed to expectation, lending still more construct validity support to the DSI-SS suicidality measure. More specifically, in context of mixed results on the association between suicidality and age in the 15–24 year old age group, we made no firm prediction about this relationship, and found a small but statistically significant correlation between age and suicidality. In this sample, younger people tended to obtain slightly higher suicidality scores. We did predict that the age–suicidality relation would vary by gender, and this was, in fact, the case: a negative relationship between age and suicidality held for women, but not for men.

Regarding gender, we again deferred explicit hypothesis about the zero-order correlation between gender and suicidality, because of mixed findings in the literature. In fact, in this sample, there was no association between gender and suicidality. However, we expected — and found — that depressed males would obtain higher suicidality scores than their depressed female counterparts. Consistent with past research (e.g. Blair-West et al., 1999), it appears that suicidality characterizes male depression somewhat more than female depression.

This last result (like all our results) illustrates our “boot-strapping” approach to construct validity (the “boot-strapping” reference is to pulling oneself up by one’s bootstraps, an analogy used by Cronbach and Meehl (1955) to describe their approach to construct validation). The finding that gender and depression interact to predict suicidality, such that depressed males report more suicidality than depressed females, replicates past work and simultaneously validates the DSI-SS suicidality measure (because it produced the same pattern of findings as have other measures of suicidality).

We presented the distribution of DSI-SS suicidality scores in Table 2, so that clinicians and researchers could form their own opinions about possible cut-point scores, in context of their own needs and local considerations. As a general rule, we found a DSI-SS cut-score of 3 appealing, but this is offered only as a general guideline. An avenue for future research is to empirically determine optimal DSI-SS cut-points, perhaps using statistical prediction rule and receiver operating characteristics techniques (see Swets, Dawes & Monahan, 2000). These techniques require a “gold-standard” against which to compare test performance, which of course is not easy to come by regarding suicidality (perhaps a panel of clinical experts, who make suicide risk designations based on interviews with patients, and whose inter-rater reliability is adequate, would serve; however, Joiner, Rudd and Rajab (1999) found that patients’ self-report may actually have *more* probative value than clinician-ratings).

The study has some limitations which should be considered when interpreting our findings. We included no measure of test-taking approach, and thus have no means to address whether low-scorers on the DSI-SS may be denying suicidal symptoms that actually exist, whether high-scorers on the DSI-SS may be exaggerating suicidal symptoms that actually are minimal, or both. The measure is meant as an initial screen, and so in the case of high-scorers and symptom exaggeration, more in-depth testing and interviewing can assess for the possibility of exaggeration (and the fact that someone may exaggerate symptoms is useful clinical information in general, not just regarding suicidality). In the case of low-scoring symptom deniers, the DSI-SS is no help. But then, what screen is?

Relatedly, the DSI-SS items are very straightforward, raising the question of whether a patient would deny suicidal ideation when asked by a practitioner, but disclose suicidality on the DSI-SS screen. In fact, this situation has been documented as relatively common in general practice settings (McKelvey, Davies, Pfaff, Acres & Edwards, 1998). Moreover, although there may be

redundancy between the screen and a practitioner's question, the screen affords the additional advantage of concise, quantified information which can be compared to the large-sample means and standard deviations presented here.

Another limitation is that our measure, results, and conclusions are limited to suicidal *ideation*, and may not apply to suicidal behavior. It is important to emphasize that the screen is intended to detect suicidal ideation — an important symptom in its own right — and is not claimed to predict future suicidal behavior. In this context, we encourage future researchers to examine the relation of DSI-SS scores to suicidal behavior, including past suicide attempts. Also, because many of our indices are self-report measures, the issue of common method variance should be addressed. While this issue should be considered, it is unlikely to substantially affect our results because: (1) we expected and found that self-report measures would *differentially* relate to each other (see findings that the relation between DSI-SS and CES-D exceeded that between DSI-SS and GHQ); and (2) it is not likely that presenting complaint, age, and gender would be affected by common method variance bias, and still, results involving these variables conformed to expectation.

A final limitation is that the general practitioners volunteering to participate in the study were not randomly selected and may thus represent a biased sample. If there is a bias, we would assume that it lies in the direction of selecting practitioners with more interest, and probably skill, in working with distressed and suicidal young people. It is possible that such practitioners might be more likely to attract troubled young people than practitioners with less interest and aptitude in working with them. The general practitioners surveyed were also much more likely to come from urban than rural areas. While this is true of Australia's population generally, it may have biased the study to areas where youth suicide rates are relatively lower (i.e. Australian urban areas; Baume, 1997).

In conclusion, we have presented a brief screening tool for suicidality (the depressive symptom index suicidality subscale) for use with young people in general health settings. The measure is very brief, and its application is straightforward. We have shown here that the measure has favorable reliability and validity characteristics. Because it is brief, easy to use, reliable, and valid, we encourage its use to combat a vexing international health problem.

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## Appendix A. Depressive symptom index — suicidality subscale

Instructions: on this questionnaire are groups of statements. Please read all of the statements in a given group. Pick out and circle the one statement in each group that describes you best for

the past *two weeks*. If several statements in a group seem to apply to you, pick the one with the higher number. *Be sure to read all of the statements in each group before making your choice.*

- (A)           0           I do not have thoughts of killing myself.  
               1           Sometimes I have thoughts of killing myself.  
               2           Most of the time I have thoughts of killing myself.  
               3           I always have thoughts of killing myself.
- (B)           0           I am not having thoughts about suicide.  
               1           I am having thoughts about suicide but have not formulated any plans.  
               2           I am having thoughts about suicide and am considering possible ways of doing it.  
               3           I am having thoughts about suicide and have formulated a definite plan.
- (C)           0           I am not having thoughts about suicide.  
               1           I am having thoughts about suicide but have these thoughts completely under my control.  
               2           I am having thoughts about suicide but have these thoughts somewhat under my control.  
               3           I am having thoughts about suicide but have little or no control over these thoughts.
- (D)           0           I am not having impulses to kill myself.  
               1           In some situations I have impulses to kill myself.  
               2           In most situations I have impulses to kill myself.  
               3           In all situations I have impulses to kill myself.

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