

Suicidal Mental Imagery: Investigating a Novel Marker of Suicide Risk

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Abstract

Rates of suicidal ideation and behavior are high and increasing in emerging adulthood. Research focused on suicidal ideation as a predictor of suicidal behavior has nearly exclusively conceptualized suicidal ideation as verbal thoughts about suicide. Emerging research suggests, however, that mentally imagining suicide may be even more impairing than verbal thoughts about suicide. Thirty-nine emerging adults with a lifetime history of suicidal cognitions completed self-report assessments of characteristics of their suicidal cognitions, histories of suicide plans and behavior, and the degree to which their suicidal cognitions took the form of mental imagery or verbal thought. Suicidal mental imagery predicted more intense and longer duration of suicidal cognitions, a higher likelihood of having made a suicide plan, and a higher likelihood of having made a suicide attempt over and above suicidal verbal thoughts. Thus, suicidal mental imagery could provide a novel target for suicide assessment and intervention for emerging adults.

Keywords

suicidal mental imagery, suicidal verbal thoughts, suicide plan, suicide, attempt, suicidal behavior

Suicidal ideation and behavior are common and increasing among emerging adults (Duffy et al., 2019; Mortier et al., 2018). Estimates suggest that 22.3% of college students have experienced suicidal ideation, 6.1% have made a suicide plan, and 3.2% have made a suicide attempt in their lifetime (Mortier et al., 2018). There is a need to identify novel predictors of suicide to target in prevention and intervention efforts. Suicidal mental imagery, or imagining suicide-related content (e.g., imagining hanging one's self), is one such promising construct.

In both clinical and research contexts, suicide risk assessment has predominately focused on suicidal ideation, or verbal thoughts about suicide (e.g., "I wish I was not alive"). Recent research suggests, however, that suicidal mental imagery is prevalent in individuals who report suicidal cognitions and is not captured by existing measures of suicide risk (Crane et al., 2012; Holaday & Brausch, 2015; Sheehan et al., 1998). Across samples of college students with suicidal cognitions (Holaday & Brausch, 2015), adults with a history of suicidal cognitions and either bipolar or unipolar depression (Hales et al., 2011), and adults with a history of depression and suicidal ideation and/or suicidal behavior (Holmes et al., 2007), the vast majority of individuals reported suicidal mental imagery when most acutely suicidal.

Although no studies have examined relations between suicidal mental imagery and rates of suicidal behavior, there is

reason to suspect that suicidal mental imagery may be associated with more severe suicidal symptoms. Adults reporting suicidal mental imagery had more severe suicidal cognitions (Ng et al., 2016) and higher scores on a measure of overall suicidality (Holaday & Brausch, 2015) than adults who did not report suicidal mental imagery. In addition, 78% of adults who reported suicidal cognitions reported suicidal mental imagery, rates which rose to 100% among those who had attempted suicide (Crane et al., 2012) and as many as 82% of adults reported that their suicidal mental imagery made them want to act (Hales et al., 2011; Schultebrauck et al., 2020). Yet no research has directly tested whether suicidal mental imagery is associated with increased risk for suicidal behavior.

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These findings suggest that suicidal mental imagery is a common, yet woefully understudied, experience among individuals at risk of suicide and that studying suicidal mental imagery in emerging adulthood is particularly important given the high rates of suicide in this population (e.g., Mortier et al., 2018). The current study documented rates of suicidal mental imagery in emerging adults and evaluated associations among suicidal mental imagery, severity of suicidal cognitions, and risk for suicidal plans and behavior. We expected that the majority of emerging adults with suicidal cognitions would report suicidal mental imagery and that greater suicidal mental imagery would be associated with more intense and longer duration suicidal cognitions and a higher likelihood of suicide plans and behavior. All hypotheses were exploratory given the novelty of examining suicidal mental imagery as a marker of suicide risk.

Method

Participants

Participants were 39 undergraduate college students ($M_{\text{age}} = 18.90$, $SD = 1.94$; age range 18–29¹) who reported a lifetime history of suicidal cognitions. Participants were identified for inclusion in the sample by responding affirmatively to the question, “Have you ever had thoughts of killing yourself?” Participants were recruited from the psychology department subject pool of a public university in the northeastern United States and received course credit for completing the study. The sample predominantly identified as female (79.5% female, 15.4% male, 5.1% other), White (89.7% White, 2.6% Black or African American, 2.6% Asian, 2.6% American Indian/Alaska Native), and not Hispanic/Latinx (7.7% Hispanic/Latinx). All participants were provided with a list of resources for mental health services and received an in-person assessment of imminent suicide risk by a trained research assistant, though no imminent risk was identified. G*Power (Faul et al., 2007) was used to conduct a priori power calculations based on a logistic regression model testing whether suicidal mental imagery predicted suicidal behavior. A sample size of 34 was sufficient to detect an odds ratio of 3.48 for having engaged in suicidal behavior ($\alpha = .05$, power = .80). The odds ratio for this analysis was estimated based on preliminary data collected by the first author on the relation between suicidal mental imagery and history of suicide attempts in adolescents.

Procedure

Participants reported on their demographic characteristics (i.e., date of birth, age, gender identity, race, and ethnicity) and completed the following measures online using Qualtrics® while attending an in-person laboratory session:

Depressive symptoms. To assess severity of depressive symptoms, participants completed the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D includes 20 items that reflect symptoms of depression. Participants rate

how often they experienced each symptom in the last week on a 4-point Likert scale ranging from 0 (*Rarely or none of the time; less than 1 day*) to 3 (*Most or all of the time; 5–7 days*). Higher scores reflect more severe depressive symptoms. Reliability was strong in the present study ($\alpha = .91$).

Self-injurious cognitions and behavior. Participants completed the self-report version of the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007), which assesses presence and characteristics of suicidal cognitions, suicide plans, suicidal behaviors without intent, and suicide attempts.

Suicidal cognitions. Average intensity was assessed with the question, “On average how intense were these thoughts?” and worst point intensity was assessed with the question: “At the worst point how intense were your thoughts of killing yourself?” with ratings for both items ranging from 0 (*Low/Little*) to 4 (*Very Much/Severe*). Duration was assessed with item, “When you have thoughts of killing yourself, how long do they usually last?” rated from 0 (*0 seconds*) to 7 [*wide range (spans > 2 responses)*].

Self-injurious plans and behavior. To assess history of making a suicide plan, participants were asked, “Have you ever actually made a plan to kill yourself?” To assess suicidal behaviors without intent, participants responded to question, “Have you ever done something to lead someone to believe that you wanted to kill yourself when you really had no intention of doing so?” To assess suicide attempts, participants were asked, “Have you ever made an actual attempt to kill yourself in which you had at least some intent to die?” All items were answered 0 (*yes*) or 1 (*no*). Construct validity and test-retest reliability of the SITBI have previously been shown to be strong (Nock et al., 2007).

Suicidal mental imagery and verbal thoughts. Following completion of the SITBI, participants were told, “When people have thoughts of suicide, their thoughts can seem like words or like images.” They then responded to the questions, “How often are your suicidal thoughts in words?” and “How often are your suicidal thoughts in images?” on separate 5-point Likert scales ranging from 1 (*Almost never*) to 5 (*Almost always*). Finally, they responded to the question “When you have suicidal thoughts, do they tend to be more in words or more in images?” on a dichotomous scale, that is, 0 (*words*) or 1 (*images*).

Results

Participants reported moderate levels of suicidal mental imagery ($M = 2.51$, $SD = 1.30$) and suicidal verbal thoughts ($M = 2.23$, $SD = 1.22$). Nearly three quarters (74.36%) of the sample reported some degree of suicidal mental imagery, 64.10% of the sample reported some degree of suicidal verbal thoughts, and 51.28% of the sample reported some degree of both suicidal mental imagery and suicidal verbal thoughts. When asked whether they tend to experience suicidal cognitions more as imagery or more as verbal thoughts, 56.41% said

Table 1. Descriptive Statistics and Bivariate Correlations Among Primary Study Variables.

Primary Study Variables	M (SD)/n (%)	1	2	3	4	5	6
1. Suicidal Mental Imagery	2.51 (1.30)	–	–.19	.42**	.48**	.46**	.67***
2. Suicidal Verbal Thoughts	2.23 (1.22)		–	.06	.20	–.06	.08
3. Average Intensity of Suicidal Cognitions	2.36 (1.06)			–	.72***	.39*	.26
4. Worst Point Intensity of Suicidal Cognitions	2.92 (1.13)				–	.59***	.39*
5. Duration of Suicidal Cognitions	3.85 (1.99)					–	.15
6. Depressive Symptoms ^a	23.38 (11.01)						–
7. Predominantly Suicidal Mental Imagery	22 (56.4%)						

Note. Predominantly suicidal imagery refers to the proportion of participants self-reporting that the majority of the time, their suicidal cognitions take the form of mental images (rather than words).

* $p < .05$. ** $p < .01$. *** $p < .001$.

^aOn average, the sample exceeded the clinical cutoff of 16 for depressive symptoms on the CES-D with 76.92% of the sample ($n = 30$) reporting clinically elevated symptoms.

Table 2. Hierarchical Linear Regression Analyses for Associations Between Suicidal Mental Imagery and Characteristics of Suicidal Cognitions (Average Intensity, Intensity at Worst Point, and Duration).

Predictors	Average Suicide Cognition Intensity			Intensity of Worst Suicide Cognitions			Duration of Suicide Cognitions		
	Step Statistics		Final Statistics	Step Statistics		Final Statistics	Step Statistics		Final Statistics
	ΔR^2	B (SE)	B (SE)	ΔR^2	B (SE)	B (SE)	ΔR^2	B (SE)	B (SE)
Step 1	.07			.15*			.02		
Depressive Symptoms		.03 (.02)	.00 (.02)		.04 (.02)*	.01 (.02)		.03 (.03)	–.03 (.03)
Step 2	.00			.03			.05		
Verbal Suicidal Thoughts		.03 (.14)	.12 (.14)		.16 (.14)	.27 (.14) [†]		–.12 (.27)	.11 (.25)
Step 3	.12*			.14*			.21**		
Suicidal Mental Imagery		.37 (.16)*	.37 (.16)*		.42 (.16)*	.42 (.16)*		.89 (.29)**	.29 (.29)**
Total R ²	.19 [†]			.32**			.23*		

[†] $p < .06$. * $p < .05$. ** $p < .01$. *** $p < .001$.

they experienced suicidal cognitions predominantly as imagery. See Table 1 for correlations among study variables. There were no missing values, and no univariate outliers were detected.

Hierarchical linear regression models were tested to evaluate whether suicidal mental imagery predicted characteristics of suicidal cognitions over and above depressive symptom severity and suicidal verbal thoughts (see Table 2). Suicidal mental imagery predicted more intense suicidal cognitions on average ($B = 0.37$, $SE = .16$, 95% CI [0.05, 0.69], $p = .03$) and at their worst point ($B = 0.42$, $SE = .16$, 95% CI [0.10, 0.73], $p = .01$) and was associated with longer duration of suicidal cognitions ($B = 0.89$, $SE = .29$, 95% CI [0.30, 1.48], $p = .004$).

A series of hierarchical binary logistic regression models were then conducted to assess associations between suicidal mental imagery and likelihood of suicide plans and behaviors after controlling for depressive symptom severity and suicidal verbal thoughts (see Table 3). Individuals reporting higher levels of suicidal mental imagery were more likely to have made a suicide plan, $B = 1.01$, $SE = 0.43$, AOR = 2.76, 95% CI [1.19, 6.40], $p = .02$, or a suicide attempt, $B = 1.05$, $SE = 0.48$, AOR = 2.85, 95% CI [1.11, 7.31], $p = .03$. No significant association was found between suicidal mental imagery and likelihood of suicidal behaviors without intent, $B = 0.50$, $SE = 0.39$,

AOR = 1.66, 95% CI [0.77, 3.58], $p = .20$. Two multivariate outliers were detected for models predicting suicide plans and attempts. Models were run with and without outliers. The pattern of results was identical; thus, all cases were retained.

Discussion

Suicide research has focused nearly exclusively on the study of suicidal verbal thoughts. However, suicidal mental imagery appears to be very common among individuals at risk of suicide and may confer significant risk beyond what can be explained by suicidal verbal thoughts. Within this sample of emerging adults with suicidal cognitions, nearly 75% of participants reported suicidal mental imagery and 56.41% reported that their suicidal cognitions more often took the form of imagery compared with verbal thoughts. This is consistent with prior work suggesting that suicidal mental imagery is common among those at risk of suicide (Crane et al., 2012; Hales et al., 2011; Holaday & Brausch, 2015; Holmes et al., 2007; Ng et al., 2016).

In addition, after controlling for suicidal verbal thoughts and depressive symptom severity, suicidal mental imagery was associated with more intense and longer duration suicidal cognitions and higher likelihood of having made a suicide plan or attempt. This was not the case for suicidal behavior without

Table 3. Binary Logistic Regression Analyses for Associations Between Suicidal Mental Imagery and Likelihood of Suicide Plan, Suicidal Behavior Without Intent, and Suicide Attempts.

Predictors	Suicide Plan				Suicidal Behavior Without Intent				Suicide Attempt			
	B (SE)	Wald	AOR	95% CI	B (SE)	Wald	AOR	95% CI	B (SE)	Wald	AOR	95% CI
Step 1												
Depressive Symptoms	0.06 (0.04)	2.85	1.06	0.99, 1.14	0.02 (0.04)	0.37	1.02	0.95, 1.10	0.01 (0.04)	0.09	1.01	0.94, 1.08
Step 2												
Depressive Symptoms	0.06 (0.04)	2.87	1.06	0.99, 1.14	0.02 (0.04)	0.35	1.02	0.95, 1.10	0.01 (0.04)	0.07	1.01	0.94, 1.08
Verbal Suicidal Thoughts	-0.04 (0.31)	0.02	0.96	0.53, 1.75	0.08 (0.32)	0.07	1.09	0.58, 2.03	0.18 (0.31)	0.35	1.20	0.65, 2.21
Step 3												
Depressive Symptoms	-0.00 (0.04)	0.01	1.00	0.92, 1.09	-0.01 (0.04)	0.09	0.99	0.91, 1.07	-0.06 (0.05)	1.50	0.95	0.86, 1.04
Verbal Suicidal Thoughts	0.31 (0.38)	0.66	1.36	0.65, 2.89	0.24 (0.36)	0.45	1.27	0.63, 2.55	0.58 (0.42)	1.93	1.79	0.79, 4.06
Suicidal Mental Imagery	1.01 (0.43)	.5.56	2.76*	1.19, 6.40*	0.50 (0.39)	1.64	1.66	0.77, 3.58	1.05 (0.48)	4.76	2.85*	1.11, 7.31*

[†] $p < .06$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Note. AOR = Adjusted Odds Ratio; 95% CI = 95% Confidence Interval; Wald = Wald Statistic.

Model Chi-Square for Suicide Plan, $\chi^2(3) = 10.16$, $p = .02$; for Suicidal Behavior Without Intent, $\chi^2(3) = 2.15$, $p = .54$; for Suicide Attempt, $\chi^2(3) = 6.57$, $p = .09$.

intent, suggesting that suicidal mental imagery may be uniquely associated with suicidal intent, perhaps because mental imagery inherently includes some degree of detail. There are multiple reasons why suicidal mental imagery may be particularly impairing. First, suicidal mental imagery may elicit greater negative affect than suicidal verbal thoughts. Notably, negative imagery results in increased negative affect relative to negative verbal thought (Mathews et al., 2013), and rumination has been associated with greater depressed mood when experienced in imagery form (e.g., Lawrence et al., 2018). Second, suicidal mental imagery may be closer to actual perception than verbal thoughts. Mental imagery and perception share largely overlapping neural circuitry (e.g., Ganis et al., 2004), and individuals consistently rate mental imagery to be more realistic than verbal thought (Holmes & Mathews, 2010). Individuals who mentally imagine suicidal content may respond as if viewing that content in real life, potentially increasing the likelihood of suicidal behavior. Finally, mentally imagining suicide may serve as a form of rehearsal of suicidal behavior, again increasing risk for suicide. Mentally imagining an action can increase the chance of engaging in that action (e.g., Libby et al., 2007), and suicidal mental imagery could serve to habituate individuals to the idea of engaging in suicidal behavior via heightened capability for suicide (Joiner, 2005; Van Orden et al., 2010).

Several limitations of this study warrant future research. First, this study was cross-sectional, and longitudinal research is needed to determine whether suicidal mental imagery prospectively predicts characteristics of suicidal cognitions and suicidal plans and behavior. This information is critically needed to determine whether assessing suicidal mental imagery may help to prevent future suicide. In addition, the sample was modest in size and fairly homogeneous (i.e., predominately female and White); findings should therefore be interpreted

with caution. Larger samples are needed to increase confidence in the stability of these effects and to examine the prevalence of suicidal mental imagery within larger and more diverse populations. Recent evidence suggests, for example, that rates of suicide are increasing among specific demographic groups (e.g., Black youth; Bridge et al., 2018) but data are needed to determine whether individuals with different racial or ethnic identities similarly experience suicidal mental imagery. Reliance on self-reported suicidal mental imagery and verbal thought also is limited in that individuals may have difficulty reporting on their own cognitions. That said, suicidal mental imagery and verbal thoughts of suicide are inherently internal processes and self-report of these processes provides valuable information on individuals' perceptions. Future work should incorporate additional methodologies (e.g., ecological momentary assessment) to bolster the validity of such measurement.

The current study adds to a growing body of literature suggesting that suicidal mental imagery is prevalent and confers significant risk beyond the suicidal verbal typically studied. Results highlight the need for further research on suicidal mental imagery as a potent predictor of suicide risk and potential target of intervention. Clinically, incorporating examination of suicidal mental imagery in assessment of suicide risk has potential to improve prediction and ultimately, prevention, of suicidal behavior. Although empirical testing of intervention approaches is needed, rescripting suicidal mental imagery or mentally imagining reasons for living or using one's safety plan could be promising. By better understanding the experience of suicidal mental imagery, interventions could ultimately be more effective in reducing suicide risk.

Author Contributions

Hannah R. Lawrence contributed to conception, design, acquisition, analysis, and interpretation; drafted the manuscript; critically revised

the manuscript; gave the final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Jacqueline Nesi contributed to analysis and interpretation; critically revised the manuscript; gave the final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy. Rebecca A. Schwartz-Mette contributed to conception, design, acquisition, and interpretation; critically revised the manuscript; gave the final approval; and agreed to be accountable for all aspects of work ensuring integrity and accuracy.


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Open Practices

The raw data, analysis code, and materials used in this study are not openly available but are available upon request to the corresponding author. Data and materials for this study have not been made publicly available. The design and analysis plans were not preregistered.

Note

1. Although emerging adulthood often is defined as 18- to 25-years-old, the present study included participants up to age 29 given that all participants were in a similar developmental stage (i.e., college students).

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