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Psychological inflexibility predicts suicidality over time in college students

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Abstract

Objective:

It is essential to identify modifiable risk factors that can be targeted to reduce suicidal ideation (SI) and behavior in college students. Psychological inflexibility, a pattern of responding to internal experiences in a literal and rigid way, and attempting to control those experiences even when it interferes with valued living, could theoretically lead to SI or increase its intensity.

Method:

Psychological inflexibility and its component processes were tested as a predictor of SI in a longitudinal survey of college students ($n = 603$, age $M = 20.62$, 68.9% female, and 94.0% White) in a series of cross-sectional and longitudinal hierarchical regression models, controlling for relevant predictors such as distress and baseline SI. Interactions were also tested between psychological inflexibility and distress, cognitive defusion, values obstruction, and values progress in predicting SI.

Results:

Psychological inflexibility predicted SI cross-sectionally and longitudinally, controlling for distress and baseline SI. Psychological inflexibility interacted with distress, cognitive fusion, and values progress such that distress, cognitive fusion, and values progress had the strongest association with suicidal ideation among those who were high in psychological inflexibility.

Conclusions:

Psychological inflexibility may be a useful mechanism to target for suicide prevention in college students.

Keywords: *suicidal ideation; suicide prevention; college student mental health; psychological flexibility; values*

Psychological inflexibility predicts suicidality in college students

Suicide is the second leading cause of death in college-aged individuals (Centers for Disease Control and Prevention, 2014). Suicidal behaviors are preceded by suicidal ideation, and college students report higher levels of suicidal ideation than the general public (Garlow et al., 2008; Crosby, Han, Ortega, Parks, & Gfroerer, 2011). College students are at a particularly high risk of suicidal ideation and behavior due in part to increased stressors from academic pressure, financial strain, and a disconnection from previous forms of social and familial support (Aselton, 2012). Recently, greater numbers of college students have sought mental health treatments, and college counseling centers have been unable to meet the rising demand for services (Drum, Brownson, Denmark, & Smith, 2009). With rising rates of suicidal ideation and strained mental health resources on college campuses, it is important to find ways to treat suicidal ideation.

Identifying modifiable processes that contribute to suicidal ideation could aid in the development of effective interventions. One such modifiable process is psychological inflexibility, which refers to the rigid attachment to internal experiences, such that they interfere with living according to one's values (Hayes, Strosahl, & Wilson, 2012). Psychological inflexibility is a multifaceted construct that encompasses mental and behavioral processes, including cognitive fusion, experiential avoidance, and disruption of values-based actions. Cognitive fusion is the over-identification with internal experiences, such as that the individual considers their thoughts as truths as opposed to a transient experience. Experiential avoidance describes the process of rejecting current private experiences and attempting to change their occurrence or frequency, as opposed to accepting them for what they are. Values are the qualities through which an individual finds meaning and purpose in their behavior, and valued action is the purposeful pursuit of such values. Psychological inflexibility could lead to suicidality due to

viewing painful thoughts literally and working to control unwanted inner experiences in ways that limit contact with valued living.

Psychological inflexibility is the primary therapeutic mechanism for Acceptance and Commitment Therapy (ACT) and aspects of inflexibility (e.g., experiential avoidance, cognitive fusion, lack of valued action) are targeted by a wide range of modern cognitive behavioral therapies, particularly those emphasizing acceptance and mindfulness-based methods (Hayes, Villatte, Levin & Hildebrandt, 2011). ACT has empirical support for efficacy in treating a wide range of psychological disorders, including those that serve as risk factors for suicidal behaviors in college students, such as mood and anxiety disorders, stress, and substance use (A-Tjak et al., 2015). Preliminary research indicates ACT interventions may successfully decrease suicidal ideation in veteran and psychiatric outpatient samples (Walser et al., 2015; Ducasse et al., 2014). However, a recent review concluded that there is currently an insufficient amount of research to determine the efficacy of ACT for self-harm and suicidal ideation (Tighe et al., 2018).

To-date only a few studies have examined the relation between psychological inflexibility and suicidality, finding a positive relation consistent with theoretical predictions (Walser et al., 2015; Ellis & Rufino, 2016; Ducasse et al., 2014). However, these studies have not investigated specific components of psychological inflexibility or their potential interactions (i.e., does being higher in inflexibility lead to a stronger relation between cognitive fusion and suicidality). Components of psychological inflexibility interact to predict other problems such as depression and anxiety (Bardeen & Fergus, 2016), and knowing the effects of specific components and interactions could help to develop targeted interventions for suicidality.

Methods

Participants and Procedures

A sample of 603 college students participated in this study. The mean age was 20.63 (*SD* = 4.38). The sample was mostly female (68.9%), and racially homogeneous (94.0% White, 3.0% Asian, 1.2% Black, 0.8% American Indian/Alaska Native, 0.7% Native Hawaiian/Pacific Islander, and 1.3% Other). A total of 4.5% reported a Hispanic/Latino ethnicity.

Participation included providing informed consent, completing an initial baseline online survey, and completing a follow-up online survey 1 month later. Participants were recruited through the Sona research platform and were compensated with course credit for their time. All procedures were approved by the Institutional Review Board at the authors' institution.

Measures

Counseling Center Assessment of Psychological Symptoms, 34-item version (CCAPS-34; Locke et al., 2012). The CCAPS-34 is a 34-item measure of mental health problems in college students and has good reliability and validity in student samples (Locke et al., 2012). One item on the CCAPS assesses suicidality (*I have thoughts of ending my life*) and was used to measure suicidal ideation. The CCAPS Distress Index was used to measure general distress. This index typically incorporates the suicidality item on the CCAPS, but it was omitted when calculating the distress index in this study to prevent overlap between independent and dependent variables. Internal consistency for CCAPS Distress was high in this sample (α = 0.92).

Acceptance and Action Questionnaire – II (AAQ-II; Bond et al., 2011). The AAQ-II a widely-used 7-item overall measure of psychological inflexibility. The AAQ-II has been shown to have good reliability and validity in college student samples (Bond et al., 2011), and internal consistency was excellent in this study (α = 0.91).

Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). The CFQ is a 7-item

measure of cognitive fusion a key aspect of psychological inflexibility. The CFQ is well-validated and has been found to have good reliability and validity when administered to college students (Gillanders et al., 2014). Internal consistency in this sample was excellent (α = .95).

Valuing Questionnaire (VQ; Smout, Davies, Burns, & Christie, 2014). The 10-item VQ has two subscales assessing values progress and values obstruction (i.e., the degree to which values progress is impeded by internal barriers), two key aspects of psychological inflexibility. The VQ has demonstrated adequate psychometric properties in college students (Smout et al., 2014), and internal consistency was good (obstruction α = 0.83, progress α = 0.83) in this study.

Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008). The 10-item acceptance subscale of the PHLMS was used to measure mindful acceptance, a positively framed aspect of psychological inflexibility. The PHLMS has been found to have satisfactory reliability and validity in college students (Cardaciotto et al., 2008). Internal consistency was good (α = 0.89) for the acceptance subscale in the current study.

Data analysis plan

First, cross-sectional relationships between psychological inflexibility processes and suicidal ideation were examined in a series of hierarchical linear regression models, with an initial model predicting suicidality based on the CCAPS distress index, followed by the addition of psychological inflexibility (AAQ-II), and then a set of specific psychological inflexibility processes (cognitive fusion, acceptance, values progress, values obstruction). A second series of longitudinal hierarchical linear regression models were computed with the same approach predicting suicidal ideation at follow-up with suicidal ideation at baseline as a covariate.

Finally, a series of moderation models were analyzed. Cross-sectional models examined potential interactions between baseline psychological inflexibility and distress, cognitive fusion,

values obstruction, and values progress in predicting suicidal ideation, controlling for main effects of each variable in the interaction. All predictor variables were centered before being entered in interactions. Longitudinal models had follow-up suicidal ideation as the outcome and controlled for baseline suicidal ideation, but were otherwise the same. Significant interactions were probed with the method described in Hayes and Matthes (2009).

Results

Descriptive statistics

Of the 603 baseline completers, 538 (89.22%) completed the follow-up survey. Completed surveys generally did not have missing data (missing data per variable for completed surveys varied from $n = 0$ to $n = 2$) and there were no significant differences between those who did and did not complete follow-up on any baseline study variables or demographics in a series of independent t-tests and chi square tests of independence. (all ps > 0.05). Therefore, listwise deletion was used with analyses excluding participants missing data on a relevant variable.

As expected given the non-clinical sample, suicidal ideation was highly positively skewed and leptokurtic (78.4% of the sample reported no suicidal ideation—a score of 0 on this item, 16.8% reported a 1 or 2, and 4.8% reported a 3 or 4, with 4 anchored at "Extremely like me."). Item scores ranged from 0 to 4, with a mean of 0.37 (SD = 0.83). A negative inverse transformation was applied, which resulted in acceptable normality (skewness = 1.55, kurtosis = 0.70) while maintaining the direction of the variable (i.e., higher scores indicating greater suicidality). The transformed suicidality variable was used as the dependent variable in all analyses. Zero-order correlations at baseline for all variables are presented in Table 1.

Cross-sectional and longitudinal regression models

First, cross-sectional models examined predictors of baseline suicidal ideation (see Table

2). As expected, distress significantly predicted suicidal ideation, but adding psychological inflexibility significantly improved the model ($\Delta R^2 = 0.012$). Adding cognitive fusion, acceptance, values obstruction, and values progress did not improve the model significantly ($\Delta R^2 = 0.009$). Values obstruction was a significant predictor of suicidality, but in the opposite direction of what would be predicted theoretically. When entering values obstruction alone after only baseline distress, it was not a significant predictor, suggesting that the effect that emerged might be due to overlap with other related variables.

Second, longitudinal models predicted suicidal ideation one month later, controlling for baseline ideation (see Table 3). Again, baseline psychological inflexibility significantly predicted suicidal ideation above baseline distress and suicidality and improved the model ($\Delta R^2 = 0.018$). Adding cognitive fusion, acceptance, values obstruction, and values progress did not improve the model ($\Delta R^2 = 0.003$), and in this case none of these additional measures were significant predictors of suicidal ideation. While these models included highly correlated predictors, all tolerance values exceed 0.2, indicating no problematic multicollinearity.

Cross-sectional and longitudinal moderation models

For cross-sectional models predicting baseline suicidal ideation, psychological inflexibility and distress interacted ($B = .003$, $SE = .001$, $p < .01$). The effect of the hypothesized focal variable (distress) was estimated at different levels of the moderator (psychological inflexibility): low (1 SD below the mean), at the mean, and high (1 SD above the mean). Distress had a larger impact on suicidality as psychological inflexibility increased, from below average ($B = .083$, $SE = .023$, $p < .001$ to above average ($B = .139$, $SE = .020$, $p < .001$; see Figure 1). A significant interaction was also found between psychological inflexibility and cognitive fusion ($B = 0.0002$, $SE = 0.0001$ $p = .03$). The effect of cognitive fusion increased as psychological

inflexibility increased from low ($B = .0001$, $SE = .002$, $p = .95$) to high ($B = .004$, $SE = .002$, $p = .06$; see Figure 2). There was also a significant interaction between psychological inflexibility and values progress ($B = -.001$, $SE = .0002$, $p < .001$). Values progress was linked to less suicidality when psychological inflexibility was average ($B = -.004$, $SE = .002$, $p = .03$) or high ($B = -.010$, $SE = .002$, $p < .001$), but not low ($B = .002$, $SE = .002$, $p = .49$; see Figure 3). There was not a significant interaction between psychological inflexibility and values obstruction.

Analyses were repeated for longitudinal models predicting suicidal ideation one month later. Psychological inflexibility did not moderate the effects of distress, cognitive fusion, values obstruction, or values progress on later suicidal ideation controlling for baseline suicidal ideation.

Discussion

The current study examined psychological inflexibility and its component processes as predictors of suicidal ideation using survey data from a sample of college students. Psychological inflexibility predicted suicidal ideation beyond distress cross-sectionally and longitudinally. These results indicate that general psychological inflexibility is a robust predictor of suicidal ideation, replicating findings in veteran (Walser et al., 2015) and psychiatric inpatient samples (Ellis & Rufino, 2016) and extending these findings to a broader population.

Significant cross-sectional interactions were found between psychological inflexibility and distress, cognitive fusion, and values progress. The relation between distress, fusion, or values progress and suicidal ideation was stronger among those who were more inflexible. These results are consistent with the finding that psychological inflexibility moderates the effects of depression on suicidal ideation (Bryan, Ray-Sannerud, & Heron, 2015) and that aspects of inflexibility may interact to predict more severe psychopathology (Bardeen & Fergus, 2016).

The results of this study suggest that suicidal ideation could be decreased by decreasing psychological inflexibility, a process targeted via ACT (Hayes et al., 2012) and other acceptance and mindfulness-based therapies (Hayes et al., 2011). This finding is promising because psychological inflexibility can be reduced in college samples via ACT (Levin, Haeger, Pierce, & Twohig, 2017), while other risk factors for suicidal behaviors amongst students may be less easily modifiable. In addition, the findings regarding interactions suggest implications for more tailored interventions. For example, students who are highly fused or distressed may benefit most from interventions to decrease psychological inflexibility. These findings also suggest targeting not only acceptance and defusion skills, but also valued action as a risk factor that can exacerbate problems related to inflexibility. Further research examining the utility of treatments that can improve psychological flexibility as a prevention strategy to reduce suicidal ideation is warranted.

These findings should be considered as they relate to well-established risk factors for suicide such as social problem-solving deficits (e.g., Speckens & Hawton, 2008). Interventions to decrease psychological inflexibility might help individuals to persist in problem-solving if it serves their values, even when they encounter internal barriers. It is also possible that integrating problem-solving skills training with interventions to target psychological inflexibility would increase their impact on suicidality, and future studies should test these questions empirically.

The current study is limited in its ability to examine the temporal relations between psychological inflexibility and suicidal ideation. A one-month period for longitudinal analysis limits examination of the full effects of study variables, and future studies would benefit from more extended analysis. Future studies could also use a more detailed measure for suicidal ideation to gain a more nuanced understanding of the relationships examined in the current study.

Finally, considering the homogenous, mostly White sample, the results of the current study may not generalize to all students; future studies with more diverse, representative samples are needed.

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Table 1. Zero-order correlations at baseline

	1	2	3	4	5	6	7
1. CCAPS Suicidal ideation	-						
2. CCAPS Distress	.51	-					
3. AAQ-II	.48	.80	-				
4. CFQ	.42	.76	.85	-			
5. VQ Obstruction	.35	.71	.76	.71	-		
6. VQ Progress	-.33	-.55	-.53	-.45	-.54	-	
7. PHLMS Acceptance	-.35	-.59	-.65	-.68	-.55	.27	-

All correlations significant at $p < .001$.

Table 2. Cross-sectional models predicting suicidal ideation

Step	Variable	ß	t	p	R²	R² change	df	p
1	Distress	0.51	14.68	<.001	.265		599	
2	Distress	0.36	6.26	<.001	.277	.012	598	.001
	Psychological inflexibility	0.19	3.20	.001				
3	Distress	0.38	6.01	<.001	.286	.009	594	.10
	Psychological inflexibility	0.24	3.13	.002				
	Cognitive fusion	-0.04	-0.58	.56				
	Acceptance	-0.05	-0.97	.33				
	Values obstruction	-0.13	-2.36	.02				
	Values progress	-0.07	-1.58	.11				

Table 3. Longitudinal regression models predicting suicidal ideation

Step	Variable	β	t	p	R^2	R^2 change	df	p
1	SI at baseline	0.62	18.50	<.001	.390		535	
2	SI at baseline	0.53	13.87	<.001	.416	.026	534	<.001
	Distress	0.19	4.86	<.001				
3	SI at baseline	0.52	13.65	<.001	.434	.018	533	<.001
	Distress	0.01	0.18	.85				
	Psychological inflexibility	0.23	4.08	<.001				
4	SI at baseline	0.51	13.42	<.001	.437	.003	529	.54
	Distress	0.02	0.26	.80				
	Psychological inflexibility	0.27	3.73	<.001				
	Cognitive fusion	-0.06	-0.86	.39				
	Acceptance	0.01	0.23	.82				
	Values obstruction	-0.03	-0.55	.58				
	Values progress	-0.05	-1.21	.23				

Figure Captions

Figure 1. The interaction between distress and psychological inflexibility predicting suicidal ideation.

Figure 2. The interaction between cognitive fusion and psychological inflexibility predicting suicidal ideation.

Figure 3. The interaction between values progress and psychological inflexibility predicting suicidal ideation.