

EXAMINING THE VALIDITY OF A COMPOSITE MEASURE OF CORE ITEMS ON
THE CAMS SUICIDE STATUS FORM (SSF) WITH A HISTORY OF SUICIDE
ATTEMPTS AMONG A SAMPLE OF RURAL ADOLESCENTS

A Thesis
by
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Abstract

Examining the Validity of a Composite Measure of Core Items on the CAMS Suicide Status Form (SSF) with a History of Suicide Attempts Among a Sample of Rural Adolescents

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According to the Center for Disease Control and Prevention (CDC), suicide is now the second leading cause of death for adolescents ages 12 to 17. CDC data shows that over a 20-year period (1999-2019), rural youth between the ages of 10-19 died by suicide at nearly twice the rate (7.6/100k) of their urban counterparts (3.9/100k). Suicide risk assessments may be utilized when working with individuals in crisis to assess risk levels further, manage suicidality, and identify appropriate treatments. One of the few empirically derived suicide assessment methods is the Collaborative Assessment and Management of Suicidality (CAMS) model. CAMS has been associated with reduced suicidal thoughts and attempts, increased hope, fewer ER visits, and reduced self-harm. Most of these findings are based on adult samples though the number of empirical CAMS studies with adolescents is growing steadily; however, no studies have examined CAMS use with adolescents in rural schools to date. The current study assessed the validity of a five-item CAMS composite (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and suicide attempt history based on archival CAMS data collected from 86 rural adolescents between the ages of 14-19 who were administered the Initial Suicide Status Form

(SSF) between 2017-2021 in the context of a school mental health program implemented in three rural high schools in the Southeast. In addition, the relationship between gender and a history of suicide attempts was assessed in the current study. It was hypothesized that females would make up a greater proportion of youth in the sample who reported a previous suicide attempt. Contrary to expectations, the relationship between gender and a history of suicide attempts was not statistically significant. While the correlation between the five-item CAMS composite and a history of suicide attempts was in the expected (i.e., positive) direction, it was small and not statistically significant. Consequently, a post-hoc bivariate correlation was computed between the adolescents' self-reported current overall risk of suicide and their past suicide attempt history. There was a positive, moderate, and statistically significant correlation indicating that relatively higher ratings on the single item were associated with a relatively higher number of past suicide attempts. Therefore, one's Overall Risk of Suicide and suicide attempt history may better measure one's potential risk for future suicide attempts than a five-item CAMS composite. In summary, this study offers incremental support for the validity and utility of CAMS for rural adolescents who are referred for suicide risk in the context of a school mental health program.

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To Shayla Moniz, my dear friend and colleague, I am genuinely grateful for your unwavering friendship, support, assistance, and feedback throughout this process and along this journey toward our doctorate in Psychology. I am honored to call you my friend and look forward to seeing what the future has in store for us both.

“Character cannot be developed in ease and quiet. Only through experience of trial and suffering can the soul be strengthened, ambition, inspired, and success achieved.” — Helen Keller

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Examining the Validity of a Composite Measure of Core Items on the CAMS Suicide Status Form (SSF) with a History of Suicide Attempts Among a Sample of Rural Adolescents

According to the Center for Disease Control and Prevention (CDC), suicide is now the second leading cause of death for adolescents ages 12 to 17 (Drapeau & McIntosh, 2020). For those between the ages of 10 and 24, the rates have increased by 57.4% from 2007 to 2018 (Curtin, 2020). The 2019 Youth Risk Behavior Survey (YRBS) revealed that approximately 19% of high schoolers seriously considered suicide in the past 12 months, and 9% self-reported at least one suicide attempt during the past year (Ivey-Stephenson et al., 2020). The rates were higher for Black (11.8%) and Hispanic (8.9%) students compared to White (7.9%) students. When cross-tabulating sexual identity and suicide attempts, there were significantly higher rates for those who identified as lesbian, gay, or bisexual (23.4%) compared to heterosexual teens (6.4%) or those who reported being unsure of their sexual identity (16.1%). In the same analysis, 2.5% of the high schoolers reported a suicide attempt that required medical treatment by a health care professional (Ivey-Stephenson et al., 2020). Among this group, suicide attempt rates were higher for females (3.3%) than males (1.7%).

As sobering as these national statistics are for our youth overall, the suicide risk for adolescents living in rural communities is even greater (Ivey-Stephenson et al. 2020). In a comprehensive analysis of suicide rates between 1996 – 2010, suicide death rates for rural constituents across the lifespan were twice the rate than for those living in urban settings (Fontanella et al., 2015). Based on CDC data (2021) over a 20-year period (1999-2019), rural youth between the ages of 10-19 died by suicide at nearly twice the rate (7.6/100k) of their urban counterparts (3.9/100k). Though the reasons for the differences in base rates based on geography and population density are multifactorial, one of the hypothesized contributing variables is easier

access to lethal means in rural settings, especially firearms. Between 1999 – 2019, firearms were used in 46% of suicide deaths of U.S. youth, followed closely by suffocation (45%), whereas poisoning was a distant third (7%). However, when examining the mechanisms used among rural youth during the same time period, a higher proportion of the adolescents who lived in the least populous areas used firearms (56%) and fewer incidents involved suffocation (37%) while poisoning deaths were similar (5%, Center for Disease Control [CDC], 2021). Furthermore, researchers conducted a cross-sectional study that utilized data collected from the Healthy Kids Colorado Survey and found that nearly 1 in 5 high school students reported having easy access to handguns (Spark et al., 2021). However, Spark et al. (2021) reported that the proportion of youth who perceived easy access to guns was double for youth who lived in rural regions (36%) when compared to their urban counterparts (18%). Previous research suggests that firearms are the most lethal method used for suicide attempts and increased access to firearms is associated with higher fatality rates (Azrael et al., 2017; Miller et al., 2004). Access to firearms remains a nationwide concern. However, these data reveal that the risk of suicide death by firearm is a more urgent priority in rural areas. Reducing access to lethal means may be one way to help reduce suicide deaths by firearm among rural youth. However, there are other risk factors that may contribute to increase suicide rates in this population such as gender.

As reported above, according to YRBS findings, self-reported suicide attempts are nearly twice as common for female teens (3.3%) when compared to their male peers (1.7%; Ivey-Stephenson et al., 2020). One meta-analysis of longitudinal studies examining gender differences in suicidal behavior in adolescents and young adults found that females between the ages of 12 and 24 years had a higher lifetime prevalence and 12-month incidence of suicide attempts (Miranda-Mendizabal et al., 2019). Females have a relatively low rate of death by suicide when

compared to their male counterparts, which might be explained, in part, by females using less lethal means during suicide attempts (i.e., pills, cutting) and a higher probability of female help-seeking behaviors (Miranda-Mendizabal et al., 2019). In contrast, males were at higher risk of dying by suicide, which might be explained by their use of more lethal mechanisms that include firearms and hanging (Beautrais, 2003; Rhodes, 2013) and a lower likelihood of help-seeking behaviors (Miranda-Mendizabel et al., 2019). Although these factors are not unique to rural constituents, we must consider these findings along with other correlates of future suicide risk, including history of prior suicide attempts.

Prior suicide attempts have been shown to be one of the best predictors of future suicidal behaviors, specifically subsequent suicide attempts (Brent et al., 1999). Furthermore, adolescents with multiple prior suicide attempts are significantly more likely to attempt suicide in the future when compared to adolescents with a single past suicide attempt or suicidal ideation alone (Miranda et al., 2008). Goldston et al. (1999) conducted a longitudinal study of 180 psychiatrically hospitalized adolescents and found that the single best predictor for future suicide attempt after hospitalization was a previous suicide attempt. Similarly, Fergusson et al., (2005) found that individuals who attempted suicide prior to age 18 were 17.8 times more likely to attempt suicide again between the ages of 18 and 25 when compared to individuals with no history of suicide attempts. These data clearly suggest a strong need for evidence-based assessment procedures that include a full appraisal of suicide attempt history for teens, especially for youth in rural schools, given the risks as described above.

Despite the clear need to address the problem of youth suicide in rural settings, there are several well-documented barriers that get in the way, including the limited availability of a well-trained mental health workforce, transportation challenges, and economic disparities made even

more stark as a result of the COVID-19 pandemic (Michael et al., in press). One way to lessen the impact of these barriers is to bring mental health resources directly to the youth through the development of school mental health (SMH) partnerships, which allow adolescents direct access to mental health services in K-12 schools (Michael et al., 2015). In 2006, the Assessment, Support, and Counseling (ASC) Center was established in the Southeastern U.S. to deliberately address the barriers to mental health care often observed in rural communities (Michael, 2020). The ASC Center Model has grown substantially over the past two decades and there are now ASC Centers in three Southeastern school districts. The ASC Center was designed to address student and family mental health concerns through a collaborative partnership with SMH providers and Appalachian State University (Michael, 2020). The ASC center staff includes licensed mental health professionals, and graduate-level trainees under faculty supervision, including clinical psychology, social work, and marriage and family trainees, who provide psychological services to students during a school daily routine operation (Michael, 2020). The core services include crisis assessment and intervention, consultation, individual cognitive-behavioral therapy, and psychoeducational groups (Sale et al., 2014). Historically, the ASC Centers have served between 10-30% of enrolled students in one or more of these modalities annually (Michael, 2020).

Students are referred to the ASC center for a multitude of psychological concerns, the most common of which have been depression, anxiety, attention-deficit disorders, suicidality, and misuse of substances (Michael, 2020). According to the results from several studies (Albright et al., 2013; Kirk et al., 2019; Michael et al., 2016), and program evaluations over the past several years, the majority (65-80%) of students who receive treatment through the program reported clinically significant reductions in distress and related symptoms at post-treatment. The

ASC Center model not only focuses on a variety of mental health concerns but has sought to assess, treat, and manage youth experiencing suicidal thoughts or behaviors given the above average base rates of these phenomena in rural settings. Over the past 10-15 years, researchers and clinicians at the ASC Center have developed and implemented systematic crisis intervention protocols (Michael et al., 2015) with a particular emphasis on reducing access to lethal means among adolescents (Capps et al., 2019), which is an especially important risk factor to assess among rural youth (Spark et al., 2021).

In 2017, as part of an effort to continue to improve the capacity to serve these highly distressed youth in rural schools, the ASC Centers began utilizing one of the few empirically derived suicide assessment methods, the Collaborative Assessment and Management of Suicidality (CAMS) approach (Jobes et al., 1997). CAMS is a feasible and effective intervention for suicidality in adolescents and has been integrated into the daily operations at the ASC Center (Jobes et al., 2019). Based on several randomized controlled trials and a recently published meta-analysis (Swift et al., 2021), CAMS has been associated with reduced suicidal thoughts and attempts, increased hope, fewer ER visits, and reduced self-harm (Conrad et al., 2009). Most of these findings are based on adult samples though the number of empirical CAMS studies with adolescents is growing steadily (Jobes et al., 2019) and includes one recent acceptability/feasibility study (Adrian et al., 2021), at least one comprehensive psychometric study (Brausch et al, 2020) and a related investigation that examined the relationship between CAMS Suicide Status Form (SSF) items and the related correlates (age, gender) in a large urban clinical sample of recently hospitalized teens (Romanowicz et al., 2013). Though the results from these studies are promising, there were no studies located that examined the use of CAMS with adolescents in rural schools.

Since CAMS is a suicide-focused assessment and therapeutic framework, it directly assesses an individual's suicidality through the administration of the standardized SSF. Clients begin by rating their perceptions (1-5 Likert scale) of five known correlates of suicide risk, including: psychological pain, stress, agitation, hopelessness, and self-hate (Jobes et al., 2016). In addition, the SSF is used as a multipurpose tool to guide the assessment, treatment, and tracking of suicidal patients (Jobes et al., 2016). Using CAMS, the clinician and patient work collaboratively to understand the patient's suicidal state. Additional questions on the SSF focus on helping to develop a suicide-specific treatment plan that targets the patient's suicidal "drivers," defined as issues or problems that are most closely associated with a tendency to escalate to an acute suicidal crisis (Jobes et al., 2016). This patient-centered approach to suicide-specific care has been associated with reduced suicidal thoughts and attempts, increased hope, fewer ER visits, and reduced self-harm (Conrad et al., 2009) increasing one's overall wellbeing.

As mentioned previously, a growing number of CAMS investigations with youth have been published (Adrian et al., 2021; Brausch et al., 2020; Jobes et al., 2019; Romanowicz et al., 2013). Brausch et al. (2020) examined the psychometric properties of the CAMS SSF in a sample of 100 adolescents (67% female, 80% white) between the ages of 12-17 admitted to an inpatient unit by assessing the relationship of the CAMS items with concurrent measures of suicide risk. Approximately half of the teens reported a prior suicide attempt ($n = 49$; 49%). Of those 49 teens, 20 reported one past suicide attempt, 8 reported two prior attempts, 4 reported three prior attempts, and 17 reported four or more previous attempts (Brausch et al., 2020). In addition to Section A of the SSF, concurrent measures of suicide attempt history, self-esteem, and stress were administered to the youth. Findings indicated that the five items on the SSF (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and the overall current risk

of suicide (Item #6) were significantly correlated with concurrent measures, including a previous suicide attempt history as measured by the Self-Harm Behavior Questionnaire (Guitierrez et al., 2001), but not on a separate measure of stress ($p = .06$). Adolescents who reported previous suicide attempts had significantly higher ratings on Psychological Pain, Hopelessness, Self-Hate, and Overall Risk of Suicide. Brausch et al. (2020) also reported that the results from a confirmatory factor analysis suggested a two-factor solution whereby the first three items (Factor 1: Psychological Pain, Stress, Agitation) were associated with acute risk, whereas items four and five (Factor 2: Hopelessness, Self-Hate) were distinct but related and labeled as chronic indicators of suicide risk. Overall, the study by Brausch supports the validity and potential clinical utility of CAMS as an effective and efficient assessment of adolescent suicidality (Brausch et al., 2020). At the same time, significant questions remain unanswered, including whether CAMS is a promising approach for outpatient samples of adolescents in rural schools.

In a related study, Romanowicz et al. (2013) assessed the utility of the CAMS approach in a large urban inpatient sample of 1153 youth (68% female, 82% white) between the ages of 8-18 by assessing correlates of suicide risk (prior history, access to firearms) using the SSF which was administered within 24 hours of admission. Some of the analyses were run by age group/school status: elementary ($n = 133$), middle ($n = 303$), and high school ($n = 598$). Significant differences were observed between groups, with high school-age patients reporting relatively higher ratings on all five items on the SSF (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and the overall current risk of suicide (Item #6) when compared to the younger cohorts. Relative to males, females reported significantly higher ratings on Psychological Pain, Stress, Hopelessness, and Self-Hate. However, there were no significant differences observed for Agitation or self-reported overall risk of suicide based on gender.

Females were also more likely to have reported a suicide attempt just prior to the hospitalization. However, there were no gender differences observed in perceived access to firearms.

Taken together, the literature summarized above regarding the use of CAMS with teens provides some important empirical insights. At the same time, there are some critical gaps that deserve further inquiry, especially since what we know about using CAMS with adult populations might not necessarily apply to working with suicidal youth (Parellada, 2008). Though the Brausch et al. (2020) and Romanowicz et al. (2013) studies had large sample sizes, were well-designed, and helped to better understand the relationship between the SSF items and correlates of suicide risk, they were both based on inpatient samples from mostly urban settings, with suicidality as the primary reason for hospitalization. Therefore, the current study was designed to assess the validity of using CAMS in an outpatient sample of rural adolescents to further our understanding of how CAMS might be helpful in a more geographically and clinically diverse population.

Specifically, the primary aim of the current study was to assess the validity of a five-item CAMS composite of current core symptoms (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and their relationship with a past history of suicide attempts in a sample of outpatient rural teens. A secondary aim was to assess the relationship between gender and a history of suicide attempts in sample of rural teens. Given previous findings (Beautrais 2003; Ivey-Stephenson et al., 2020; Miranda-Mendizabal et al., 2019; Rhodes et al., 2013), it was hypothesized that females will make up a greater proportion of youth in the sample who reported a previous suicide attempt. The third aim was to examine basic descriptive information regarding other suicide risk factors including perceived access to lethal means, including firearms and dangerous medications. Considering previous findings regarding rural adolescent

access to lethal means (CDC, 2021; Spark et al., 2021), we are curious to see if a greater portion of adolescent in the sample reported perceived access to firearms, the most lethal method used in suicide attempts (Miller et al., 2004).

Methods

Participants

Participants included 86 adolescents, aged 14-19 ($M = 15.8$; $SD = 1.32$), in an outpatient setting (35% male, 64% female, and 1% gender diverse) who were administered an initial SSF during 2017-2021 in the context of a school mental health program implemented in three rural high schools in the Southeastern US. Of the 86 participants, 81% identified as White and 19% identified as Hispanic or Black, Indigenous, Persons of Color (BIPOC). Study participants were clinically referred to the ASC center based on self-reports, parent reports, teacher reports, or school reports of suicidal ideation or suicidal behavior. The Initial CAMS SSF-4 was administered by a licensed SMH professional, a graduate student under supervision, or both, in one of three Southeastern high schools.

School Settings

Archival CAMS data were collected from three Southeastern U.S. high schools through psychological treatment records at the ASC Centers in each high school. These data were collected under the auspices of Appalachian State University IRB study 17-0040. Each high school serves the entire population of their respective counties. Watauga County is coded as Nonmetropolitan-Urban Continuum Code Classification of 5, with a total population of 51,079 (U.S. Department of Agriculture [USDA], 2013) and an average enrollment of approximately 1,350 students per year during 2017-2021. Ashe County is coded as Nonmetropolitan-Urban Continuum Code Classification of 7 with a total population of 27,281 (USDA, 2013) with an

average enrollment of approximately 900 students per year during 2017-2021. Alleghany County is coded as Nonmetropolitan-Urban Continuum Code Classification of 6, with a total population of 16,250 (USDA, 2013) with an average enrollment of approximately 420 students per year during 2017-2021.

Procedure

The referral process for a CAMS Initial SSF assessment consisted of multiple entry points. Students self-referred for an evaluation; however, referrals typically came from concerned classmates, teachers, school employees, parents, and family members. Students were also referred after being overheard making a statement about self-harm during class or flagged in a writing assignment. Other referrals came from social media posts (e.g., Facebook, Instagram, Snapchat) or text messages to family, friends, and peers. Once a referral was made indicating that a student had reported suicide risk, a school-based clinician, school counselor, or school administrator was notified. Students were then evaluated using the Prevention of Escalating Adolescent Crisis Events (PEACE) protocol, a suicide prevention instrument designed to create a thorough risk assessment for mental health professionals working with school personnel in an educational context (Capps et al., 2019). In addition, the PEACE protocol further assessed participants' access to and type of lethal means. Students who were identified as experiencing a substantial level of risk were then clinically referred to meet with a licensed psychologist, SMH professional, or graduate student under supervision who administered an initial CAMS assessment within 10-15 minutes after being identified. Of note, SMH professionals and graduate students were trained in the administration of CAMS, which included a three-hour online training, an eight hour live role-play training with a CAMS consultant, and a minimum of four, hour-long consultation meetings with a national CAMS consultant.

The initial CAMS assessment was administered in a private room located in the ASC Center, in each participant's respective high school, taking approximately 50 minutes to complete. The initial CAMS assessment was administered in a side-by-side style, with the clinician sitting with the participant guiding them through the form completion. The SSF-4, the first page of the initial CAMS assessment, provided a quantitative and qualitative evaluation of the participant's current perceived suicide risk. The following initial CAMS assessment pages evaluated the frequency, duration, plan, preparation, rehearsal, and history of suicidal ideation or suicidal attempts. The clinician created a treatment plan and CAMS Stabilization Plan with the adolescent to address their current risk of suicide and further assessed and reduce their access to lethal means. Participants with a perceived suicide risk rating of three or higher received subsequent interim CAMS sessions with a clinician to provide suicide-specific treatment and track on-going suicidal risk. Treatment was based on individual needs and lasted for a maximum of twelve consecutive sessions.

Measures

Basic demographic information was collected including, age, gender, and race. In addition to basic demographic information, the primary measure used in the current study include Sections A and B of the CAMS SSF-4. Section A of the SSF-4 directly assesses an individual's suicidality by having the client rate their current perceptions (1-5 Likert scale; 1= low to 5 = high) of five known correlates of suicide risk including: Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate (Jobes et al., 2016). Additional questions on the SSF focus on helping to develop a suicide-specific treatment plan that targets the patient's suicidal "drivers," defined as issues or problems that are most closely associated with a tendency to escalate to an acute suicidal crisis (Jobes et al., 2016).

The first three items on Section A of the SSF-4 (Psychological Pain, Stress, and Agitation) are based on the work of renowned suicidologist Shneidman's (1993) theoretical framework of the Cubic Model of Suicide. Item one is Psychological Pain, which is based on the construct of "psychache" originally coined and defined by Shneidman as unbearable mental pain and anguish that is often a key feature for individuals experiencing suicidal mentation. Shneidman argued that suicide commonly occurs when an individual has exceeded their capacity to manage psychological pain. According to Shneidman, in order to help a suicidal person, we must first understand the nature of their psychological pain. The second item, Stress, was originally called "press" by Shneidman and refers to a general feeling of being pressured or overwhelmed. The third item is Agitation and was previously called "perturbation," a neologism coined by Shneidman that signals a sense of emotional urgency or a feeling that one must take immediate action.

The fourth item, Hopelessness, is based on Beck's (1986) work and the expectation that one's negative circumstances will not improve no matter what they do to alter the situation. Beck's theory of the negative (cognitive) triad and how it contributes to the experience of depression includes three primary elements: (1) hopelessness about oneself, (2) hopelessness about the world, and (3) pessimism about the future. Furthermore, Beck's research suggests that acute or persisting hopelessness is a risk factor for suicidal thinking and behavior.

The fifth item, Self-Hate, is based on the work of Baumeister (1990), who identified links between intolerable perceptions of oneself and a need to escape through suicide. According to Baumeister's theory, an individual's view of the self can become so intolerable that suicide becomes a perceived feasible way to escape the burden of excessive self-loathing.

In addition to the Likert-scale, clients provide a qualitative response to each item as to how these rated items are currently affecting them (e.g., “what I find most painful is...”) and rank the five items in order of importance (1 = most important to 5 = least important). Section A also asks that clients rate their *Current Overall Risk of Suicide* (Question #6) using the same 5-point Likert scale as the first five items. Question #6 helps clinicians determine whether ongoing CAMS treatment is recommended; scores >3 are considered “elevated” and serve as the primary inclusion criteria for continued CAMS care. Section A of the SSF has several more parts, including the following questions: *How much is being suicidal related to thoughts and feelings about yourself* and *how much is being suicidal related to thoughts and feelings about others*. Section A also asks clients to list their *Reasons for Living* and *Reasons for Dying*, which are ranked in order of importance. Rounding out Section A, clients are asked to rate their *wish to live* and their *wish to die* on a zero to eight scale and then asked to provide a fill-in-the-blank response to the prompt: *The one thing that would help me to no longer feel suicidal would be* (Jobes, 2016).

In addition, detailed information about suicidal thinking and suicide attempt history was collected using Section B of the Initial CAMS SSF assessment which asked specific questions about history of suicidal behaviors, including space to record no attempts, one attempt, or multiple attempts. Section B also includes prompts to inquire about access to lethal means (i.e., yes or no). The type of lethal means was collected using the CAMS Stabilization Plan and/or the PEACE protocol. Both further assessed the participants’ access to and type of lethal means.

A mean average was calculated for the five core items (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and entered as a composite measure. A history of suicide attempts, collected during Section B of the CAMS SSF, was scored, and entered in an

ordinal fashion (0 = no prior attempts; 1 = one prior attempt; 2 = two or more) as the criterion.

The participants' perceived access to lethal means, collected during Section B of the CAMS SSF, the CAMS Stabilization Plan, and the PEACE protocol, were also entered and scored nominally (1 = yes, 2 = no). Furthermore, descriptive data including participant's perceived access to specific lethal means, were collected using Section B of the CAMS SSF, the CAMS Stabilization Plan, and the PEACE protocol.

The CAMS approach of completing the SSF jointly with a patient has been shown to be a therapeutic experience. According to Poston and Hanson's (2010) meta-analysis of 17 published studies of psychological assessments with positive and clinically meaningful effects on treatment processes, the CAMS-based SSF assessment was shown to function as a therapeutic assessment. In prior studies, all six core items on the SSF have been shown to be correlated with related measures, thus providing evidence of convergent validity (Conrad et al., 2009; Jobes et al., 1997). Furthermore, the SSF has strong criterion-related validity, given that suicidal patients consistently evidence elevated ratings on the six core items when compared to non-suicidal patients (Conrad et al., 2009; Jobes et al., 1997).

Results

Prior to data analysis, the data was reviewed for completeness. There were no missing values for age and gender and the remaining outcome variables for participants had values entered 100% of time with the exception for reported access to lethal means. Five of the participants (6%) had missing data regarding access to lethal means at the time of CAMS assessment.

Of the 86 participants, the majority were female (64%; $n = 55$), with 35% ($n = 30$) identifying as males and 1% ($n = 1$) as gender diverse. Participants ranged in age from 14 to 19

years old ($M = 15.8$, $SD = 1.32$). Consistent with the demographic characteristics of the high schools, 70 of the teens (81%) identified as White and 19% ($n = 16$) identified as Hispanic or BIPOC. In general, approximately one-third of the crisis events involved students in 9th grade (31.4%), whereas the reported acute crises in 10th (24.4%), 11th (22.1%), and 12th (22.1%) grade students were roughly equivalent, as reported in Table 1.

Table 1
Sample Characteristics for the Sample Participants

Demographics Variables	Sample ($n = 86$)	
	Frequency	Percentage
Gender		
Male	30	34.9
Female	55	64.0
Gender Diverse	1	1.1
Ethnicity		
White, non-Hispanic	70	81.4
Hispanic/BIPOC	16	18.6
Grade Level		
9 th grade	27	31.4
10 th grade	21	24.4
11 th grade	19	22.1
12 th grade	19	22.1
Age ($M = 15.8$, $SD = 1.31$)		
14	16	18.6
15	25	29.1
16	15	17.4
17	21	24.4
18	8	9.3
19	1	1.2

A Pearson product-moment correlation analysis was computed to examine the relationship between a composite of the five core items on the SSF (Psychological Pain, Stress, Agitation, Hopelessness, and Self-Hate) and a reported history of suicide attempts (0 = no prior attempts; 1 = one prior attempt; 2 = two or more). A mean of the five core items were computed and entered as the composite measure. Suicide attempt history, collected during Section B of the

CAMS SSF, the CAMS Stabilization Plan, or the PEACE protocol, was entered in an ordinal fashion (0 = no prior attempts; 1 = one prior attempt; 2 = two or more) as the criterion. There was a small, positive correlation between the two variables $r(84) = .138$ but it was not statistically significant ($p = .204$). Given the above findings, a post-hoc Pearson product-moment correlation was computed to examine the bivariate relationship between a single CAMS item measuring *Current Overall Risk of Suicide* and a history of suicide attempts. The rationale for this decision is based on the fact that if client endorses a score of ≥ 3 on this single item, then the client is recommended to participate in on-going CAMS treatment designed to reduce their suicide risk. Basic descriptive information was collected from Section B on the CAMS SSF about additional suicide risk factors, including self-reported access to lethal means. Correlation was computed between adolescents' self-reported current Overall Risk of Suicide and their suicide attempt history. There was a positive, moderate correlation between the two variables, $r(84) = .308$ and it was statistically significant ($p = .004$) indicating that relatively higher ratings on the single item were associated with a relatively higher number of past suicide attempts.

To round out the the post-hoc bivariate computation (described above), bivariate PPM correlations were computed for all seven variables of interest (six CAMS items, suicide attempt history; as reported in Table 2). As reported in Table 1, among the five core SSF items, only Agitation was significantly correlated with a past history of suicide attempts ($r(84) = .27, p = .012$), whereas the remaining four items were not statistically significant. As expected, the five core items were significantly correlated with each other.

Nearly half (43%; $n = 37$) of the sample reported a past suicide attempt. Among those with a suicide attempt history, 57% ($n = 21$) reported one past suicide attempt, and 43% ($n = 16$) reported two or more past suicide attempts, as reported in Table 2. Among the males in the

sample, half of them (15/30) reported a suicide attempt history, whereas 38% ($n = 21$) of the total number of females ($n = 55$) reported a suicide attempt history. One student self-identified as gender diverse and also reported two or more attempts. Of the 15 male participants that reported a suicide attempt history, nine reported one prior suicide attempt, whereas six reported two or more prior suicide attempts. Of the 21 female participants that reported a suicide attempt history, over half reported ($n = 12$) one prior suicide attempt and the remaining nine reported two or more prior suicide attempts. An independent-samples t-test was conducted to compare suicide attempt history and gender. Means and standard deviations were computed for attempt history (0 = no prior attempts; 1 = one prior attempt; 2 = two or more). Results indicated that there was not a significant difference in suicide attempt history as a function of gender, males ($M = .70$, $SD = .79$) and females ($M = .55$, $SD = .77$); $t(83) = .88$, $p = .383$.

Table 2
Suicide Attempt History

Attempt history	Sample ($n = 86$)			
	Gender	No Attempt	One Attempt	Two or More Attempts
Male		15/30	9/15	6/15
Female		34/55	12/21	9/21
Gender Diverse		0/1	0/1	1/1
Total Attempt history		49/86	21/37	16/37

When analyzing the continuous outcomes on the SSF, means and standard deviations for participants' ratings of their current perceived level of the five assessed correlates of suicide: psychological pain, stress, agitation, hopelessness, and self-hate were computed, as reported in Table 3. Means and standard deviations were also computed for the teens' self-report current (acute) level of suicide risk (Question 6) and their reported suicide attempt history are also reported in Table 3. Descriptively, the mean rating for Wish to Live was 5.88 ($SD = 1.85$) and

their Mean Wish to Die was 3.36 ($SD = 2.12$) whereas and their average number of Reasons for Living was 3.64 ($SD = 1.28$) and 2.83 ($SD = 1.47$) for Reasons for Dying.

Table 3
Descriptive Statistics and Correlations for Study Variables

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Psychological Pain	86	3.47	1.07	—						
2. Stress	86	3.79	1.27	.353**	—					
3. Agitation	86	2.87	1.80	.269*	.313**	—				
4. Hopelessness	86	3.35	1.64	.384**	.375**	.368**	—			
5. Self-Hate	86	3.54	1.86	.372**	.412**	.349**	.471**	—		
6. Overall Suicide Risk	86	2.00	.93	.323**	.403**	.444**	.514**	.405**	—	
7. Suicide Attempt History	86	.62	.785	.057	.078	.271*	.135	-.059	.308**	—
8. 5-item Composite	86	3.40	.89	—	—	—	—	—	—	—

Note. *M* = mean and *SD* = standard deviation. * indicates $p < .05$. ** indicates $p < .01$

Of the 86 participants, 6% ($n = 5$) did not respond if they had access to lethal means. Of the 81 participants who did respond, 35% ($n = 28$) reported not having access to lethal means, while the remaining 65% ($n = 53$) reported having access to a lethal mean or a combination of multiple lethal means (e.g., firearms, medications, sharps, ligatures). Of the 53 participants who reported having access to lethal means, 21% ($n = 11$) reported having access to firearms, less than 1% ($n = 3$) reported access to a combination of firearms, sharps, and medication, 70% ($n = 37$) reported access to medications, 16% ($n = 13$) reported access to a combination of medications and sharps, 58.5% ($n = 31$) reported access to sharps, and 17% ($n = 9$) reported access to ligatures (Table 4).

Table 4
Access to Lethal Means

Means	Frequency
Medication	30
Sharps	24
Firearms	14
Ligatures	3
No Access	28

Note: Sample $n = 81/86$ participants who provided response to access to lethal means. Does not sum to 81 because some people had access to multiple means.

Discussion

The main goal of the study was to assess the validity of a five-item CAMS composite and its relationship to a prior history of attempts in a sample of outpatient rural teens. Though all five core items have been identified as independent and empirically meaningful risk factors for either acute or chronic suicide risk in several published studies of adolescent and adult samples (e.g., Brausch et al., 2019; Jobes, 2016), the composite, as conceived and computed in this study, was not significantly associated with past suicide attempts in a sample of rural teens. One possible explanation for this null finding is that even if one or more of the individual SSF items was associated with past attempts, the inclusion of all five might have diluted or obscured the unique variance explained by even a single SSF item.

As a follow-up to this conjecture, a post-hoc bivariate correlation was computed between the adolescents' self-reported current Overall Risk of Suicide and their suicide attempt history. Item number six was selected because participants with a self-perceived suicide risk rating of three or higher are referred for on-going CAMS sessions with a clinician to provide suicide-

specific treatment and track on-going suicidal risk until the risk is successfully resolved (i.e., a minimum of three consecutive sessions of two or less on Question #6). The results from our post-hoc analyses indicated that relatively higher ratings on Question #6 (current risk) was associated with a relatively higher number of previous attempts. The relationship was moderately strong and statistically significant. This finding aligns with the well-known phrase “a good predictor of future behavior is past behavior” (Miranda et al., 2008). Moreover, adolescents with multiple past suicide attempts are more likely to make a future attempt when compared to adolescents with only one past attempt or who experience suicidal ideation without attempting (Fergusson et al., 2005).

Another finding from the post-hoc correlational analyses was the discovery of a significant relationship between the SSF core item of Agitation and a previous attempt history. The relationship between Agitation and a past history was weaker than Question #6, but it was statistically significant. As discussed previously, Agitation signals a sense of emotional urgency or feeling that one must take immediate action and may increase one’s risk of suicide (Shneidman, 1993). In a meta-analysis of thirteen studies examining the association between agitation and suicide attempts and/or completions, Rogers et al. (2016) found a moderate and positive association between the two variables. However, given that the findings were cross-sectional and based on retrospective reports, causal interpretations were not offered. Though there was only one adolescent study included in the meta-analysis (i.e., Liu et al., 2006), the findings from Liu et al. (2006) and the current study suggest that these relationships should be examined further, especially as it pertains to developing more effective clinical assessments of suicidality in adolescents. One plausible explanation of this finding might relate to how those that experience agitation or a sense of urgency to act, might increase the risk for a future suicide

attempt. In the early 2000's, the FDA issued black box warnings when prescribing antidepressants for teens (Spielmans et al., 2020). The case reports submitted to the FDA suggested a potentially hazardous combination of adverse side effects (feelings of “activation”) during a depressive episode and a lack of supervision or monitoring of medication response. That is, the youth felt an increase in negative energy in the context of depressed mood, or an urgency to act or attempt suicide. Though the relationship between agitation and a history of attempt behavior is modest here and not well understood in adolescent samples overall, it should be studied further, especially since the stakes are so high.

Secondary aims were to understand the relationship between gender and a history of suicide attempts. Given previous studies (Beautrais 2003; Ivey-Stephenson et al., 2020; Miranda-Mendizabal et al., 2019; Rhodes et al., 2013), it was hypothesized that females would make up a greater proportion of youth in the sample who reported a previous suicide attempt. Our findings were consistent with previous studies in that females did make up a greater proportion (57%) of youth in our sample who reported a suicide attempt history (Beautrais, 2003; Ivey-Stephenson et al., 2020; Miranda-Mendizabal et al., 2019; Rhodes et al., 2013), yet the difference was not statistically significant. Though this finding is somewhat unexpected and requires replication, it might suggest loosening our grip on some of the longstanding assumptions made about suicide attempt risk in teens, especially those in rural areas. Moreover, though we only had one gender diverse youth participate in the study, this person reported two or more previous attempts. This “single case” is consistent with several previous studies that clearly suggest that those who identify as lesbian, gay, or bisexual, and transgender (LGBT) consistently reported higher rates of suicidal thoughts, behaviors, and attempts (Ivey-Stephenson et al., 2020). Furthermore, these findings suggest that future research is needed to explore gender differences in suicidal behavior

among males, females, and gender-diverse individuals, especially those at higher risk, including rural teens.

The third and final research aim of the study was to review the descriptive findings regarding access to lethal means (Cai et al., 2022) and other CAMS-related variables from the SSF. Of the participants that responded to access to lethal means, 35% reported not having access to lethal means, while the remaining 65% reported having access to a lethal mean or a combination of multiple lethal means, including firearms, medications, sharps, and ligatures. Of those participants who reported having access, 17% reported having access to firearms, with the most reported access to a lethal means being medication (37%), followed by sharps (30%), and ligatures (3%). Previous research suggests that 85-90% of suicide attempts using firearms result in death, whereas less than 5% of cutting attempts prove fatal (Bond et al., 2022; Cia et al., 2022). Furthermore, increased access to firearms has been associated with higher fatality rates (Azrael et al., 2017). Research also suggests that youth who perceive having easy access to firearms is double for youth living in rural regions compared to their urban counterparts (Spark et al., 2021). Our findings and previous research indicate that reducing access to highly lethal means should be a priority for suicide prevention, especially with at-risk populations such as rural youth, who have shown a higher incidence rates of perceived access to firearms (Spark et al., 2021).

Furthermore, we examined our sample's self-reported ratings of Wish to Live (WTL) and Wish to Die (WTD). We found that, overall, our sample had a higher average rating of WTL when compared to the average WTD, which was a consistent pattern reported from an unpublished CAMS study (Brausch et al., 2019) of a sample of 97 psychiatric inpatient youth. When looking at each measure separately, the average WTL in Brausch et al. (2019) was 6.16

($SD = 2.1$) and approximately commensurate with the current study's average WTL ($M = 5.88$; $SD = 1.85$) and the difference was not statistically significant, $t(181) = 0.94, p = .34$. The average WTD in the Brausch sample was lower ($M = 2.33$; $SD = 2.54$) than the current study ($M = 3.36$; $SD = 2.12$), and the difference was statistically significant, $t(181) = -2.95, p = .003$. However, the overall pattern of WTL/WTD mean scores was similar across studies. Previous research examining self-reported ratings of one's desire to live and desire to die in suicidal adults, suggests that this internal struggle one experiences when feeling suicidal may constitute a risk factor for suicide (Brown et al., 2005). Furthermore, when one's desire to live dominates their desire to die, one may be less likely to attempt suicide (Brown et al., 2005). However, if there is a strong desire to die with even a slight desire to live, one may be at a higher risk for suicide (Brown et al., 2005). Research suggests that one's suicidal behavior may be shaped by this internal ambivalence around living and dying (Brown et al., 2005). Although there is still little known about risk factors for youth, one must consider previous research when assessing an individual's desire to live and die, especially those populations at higher risk, such as rural youth.

In summary, the findings from this study suggest that one's current perceived suicide risk as assessed by a single item on the CAMS SSF, and not a composite of the five core items, is significantly associated with a history of suicide attempts in a sample of rural teens. Thus, these data provide further support that using CAMS with teenagers (Brausch et al., 2019) is a valid approach to assessing suicide risk in outpatient rural school settings as well. In addition, the relationship between the single core SSF item of Agitation and a previous attempt history should be explored further.

Clinical Implications

When considering our findings and interventions for at-risk youth, especially those living in rural areas, it is essential that mental health professionals utilize an empirically supported suicide risk assessment that includes a thorough appraisal of one's relationship with suicide, including their history of suicide attempts, and their current perceived risk of suicide.

In addition, risk factors such as gender identity and sexual orientation, should be carefully assessed in tandem with the aforementioned risk factors. It is important to emphasize that although we only had a single gender diverse student, that particular student reported multiple past attempts, which, when coupled with their gender identity, magnifies a youth's risk of suicide death even further. Clinicians should remain vigilant for these interactions as the preservation of life is the fundamental goal of CAMS treatment. Another clinical implication of this study pertains to the COVID-19 pandemic, given that several of the participants were evaluated for suicide risk since March of 2020. Conducting empirically valid assessments of suicide risk is critically important right now, especially considering increased base rates of distress, depression, anxiety, and suicidality in adolescents since the onset of the pandemic (Curtin et al., 2022; Marques de Miranda et al., 2020). Several factors have been identified as contributing to this increase in distress, including lack of social support, increased familial distress, decreased physical activity, and disruption to daily routines (Marques de Miranda et al., 2020). Simultaneous with increases in mental health concerns, many school-based services were either suspended or reduced during the pandemic (Masonbrink & Hurely, 2020), which created an even bigger gap in access. Though it is conceivable that innovations in telehealth have narrowed the gap (Jobes et al., 2019), these approaches have yet to be sufficiently scaled up or evaluated. Therefore, we must continue our efforts to better understand the relationship between

mental health concerns and risk factors for our youth, especially those at higher risk for suicide including rural teens who also have easier perceived and actual access to lethal means.

As just discussed above, suicide risk assessments should include a full appraisal of one's access to lethal means and include steps to reduce one's access, especially highly lethal means such as firearms. Research regarding access to lethal means indicates that reducing access to highly lethal means should be a priority in suicide prevention, especially with at-risk populations such as rural youth, who have shown a higher incidence of perceived access to firearms (Spark et al., 2021). Interventions should also include lethal means counseling, advising parents and guardians of the need to restrict at-risk suicidal youths' access to firearms, which has been shown to be an effective intervention in reducing deaths by suicide (Barber & Miller, 2014; Mann & Michael, 2016). Reducing one's access to firearms may include utilizing lock boxes or temporarily storing firearms outside the home (Barber & Miller, 2014b; Mann & Michel, 2016). However, voluntarily temporarily storing firearms out of the home may depend on the participation of local storage providers, including ranges, retailers, and law enforcement agencies (Betz et al., 2021). Research suggests that key stakeholders often report a desire to help their community and are willing to work with customers (Betz et al., 2021). However, clarifying and understanding local policies and regulations for firearm storage during suicide risk is vital in effectively reducing one's access.

Limitations

The study had several limitations, including a relatively small sample size and relatively imbalanced sample in terms of gender identity (35% male, 1% gender diverse). The gender difference in our sample size may be associated with previous research, suggesting that females tend to engage in more help-seeking behaviors than males and gender-diverse populations

(Hatchel et al., 2019; Miranda-Mendizabal et al., 2019). Another limitation of this study is participants provided self-reported accounts of suicidal ideation and subjective reports of psychological pain, level of stress and agitation, rate of hopelessness, and self-hate. They also provided self-reports of suicidal thoughts and feelings and how these affected their desire to live or die. Relying solely on self-reported findings is not ideal and may artificially inflate correlations. Future research should include measures from collateral reports, such as caregivers and teachers. Another limitation was the fact that the methodology involved “back dicting.” That is, we assessed the correlation between current risk and past behavior. This is certainly not ideal, but under the circumstances, provided some additional insights into how current risk relates to historic patterns of behavior.

Future Research

In summary, this study addressed several important factors associated with suicide and suicide-related behavior in youth. Our findings provided incremental support for the validity and utility of using CAMS for rural adolescents who are referred for suicide risk in the context of a school mental health program, yet additional efforts should be devoted to attempting to replicate these results, notably the correlation between Agitation and current or acute suicide risk. These findings should serve as a call to action for future research, especially given the after-effects of a global pandemic, widening disparities in access to care, ready access to lethal means for rural youth, and rising suicide rates overall.

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Vita

Kimberly Ann Holt was born in Jefferson, North Carolina, to Larry Potter and Mary Ann Keller. She graduated from Anderley Academy in December 1997. In 2005, Kimberly obtained an Associate in Accounting from Caldwell Community College in Boone, NC. She spent the next four years working in the accounting field until she gave birth to her son in 2008. Kimberly spent the next five years caring for her son, and in 2014, she began working at her son's elementary school. While working with youth, she soon realized she had a higher calling in the helping field. Kimberly returned to Caldwell Community College, where she was awarded her Associate in Science in May 2019. In the Fall of 2019, she transferred to Appalachian State University, and in May 2020, she was awarded a Bachelor of Science in Psychology. In the Fall of 2020, Kimberly began graduate school at Appalachian State University in the Clinical Psychology doctoral (PsyD) program under the mentorship of Dr. Kurt Michael. She currently resides with her husband and son in Sugar Grove, NC.