

A Psychometric Evaluation of The Life Attitudes Schedule-Short Form

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### Abstract

The Life Attitudes Schedule-Short Form (LAS-SF) is a measure of suicide proneness featuring various conceptual models. We tested four competing LAS-SF factor structures, as well as construct validity with mental health and suicide metrics. Community dwelling adults ( $N = 488$ ) completed an online cross-sectional survey. Results supported a four factor (i.e., death-related, health-related, injury-related, and self-related subscales) LAS-SF structure with one higher order factor. Death-related, injury-related, and self-related subscales demonstrated moderate positive associations with mental health and suicidal ideation. Death-related and self-related subscales showed links with suicidal ideation, as well as suicide and depression risk (controlling for other factors). This study is important in highlighting suicide proneness theory may need to be refined. LAS-SF uses include possible risk screening in clinical settings and future focus on the psychological death aspects of the LAS-SF in prospective research. Study limitations include lack of sample diversity and cross-sectional design.

Key words: Suicide; Self-Injury; Measurement; Anxiety; Depression

Suicide is a global public health problem. The World Health Organization (WHO, n.d.) estimates suicide accounts for more than 700,000 deaths annually, accounting for 1.3% of worldwide deaths. The crude suicide rate globally is about 9/100,000 persons (WHO, 2019). Recent evidence from the United Kingdom (UK) shows more than 5,500 deaths annually in England and Wales alone (Office of National Statistics [ONS], 2022). Concerningly high rates of suicide are mirrored in various other countries (e.g., Estonia, United States; e.g., Glenn et al., 2020). Given the scope of the problem, suicide prevention is a national priority in the many countries (Department of Veterans Affairs, n.d.; National Institute for Health and Care Excellence [NICE], 2022).

The magnitude of the suicide problem calls for comprehensive assessment-related research. The present study contributes by testing the psychometric properties of the Life Attitudes Schedule-Short Form (LAS-SF; Rohde et al., 1996, 2003). The LAS-SF captures the concept of suicide proneness, defined as “a broad array of suicidal and life-threatening actions, thoughts, and feelings” (Rohde et al., 2003, p. 249). The LAS-SF further incorporates life-enhancing items (Lewinsohn et al., 1995). In particular, the measure includes content related to death (e.g., thinking about death), (un)healthy lifestyles (e.g., smoking), self-perception (e.g., wishing could be someone else), and injury (e.g., punching things) (Rohde et al., 2003). We advance the applicability of the LAS-SF through psychometric evaluation among community-dwelling adults in the UK. We address the following in order to establish hypotheses for the current study: (a) survey literature on cognitive, affective, and behavioral habits germane to the LAS-SF; (b) review previous work on the LAS-SF; and (3) outline gaps answered by our work.

### **Suicide Risk and Protective Factors Covered by the LAS-SF**

The LAS-SF addresses four broad domains of suicide risk and protective factors: death-, self-concept-, health-, and injury-related (Rohde et al., 1996). Death- and self-concept related domains pertain to cognitive, emotional and behavioral factors consistent with mood disorders and negative self-schemas. For instance, suicidal ideation (a form of death-related thinking) is implicated as a direct pathway to suicide attempt/death (e.g., Klonsky et al., 2021; O’Connor & Kirtley, 2018), and is considered a required topic to cover in suicide risk assessment (e.g., Rudd & Bryan, 2022). Thoughts about death comprise a

diagnostic risk factor for suicide (American Psychiatric Association, 2022). Regarding self-concept, the LAS-SF incorporates aspects such as self-worth, wishful thinking, and meaning in life (Rohde et al., 1996). Low self-worth is implicated in suicide sequelae (e.g., Batey et al., 2010). Cross-national literature shows that positive self-appraisal holds direct protective and stress buffering roles related to suicide (e.g., Shahram et al., 2021). Finally, a greater meaning in life is a protective factor; and a lack of meaning in life is a risk factor for suicidal ideation and behavior supported by considerable recent international literature (e.g., Bryan et al., 2019; Kalashnikova et al., 2022).

Health- and injury-related factors covered by the LAS-SF largely draw from the health and risky/impulsive behavior literatures (e.g., Weiss et al., 2015). Health behaviors are linked to suicide; for instance, alcohol use is a well-established international risk factor for suicide (see Borges et al., 2017 for a review). Other health behaviors (e.g., smoking, unhealthy food choices) may be associated with suicide (e.g., Bergmans et al., 2020) via other factors such as underlying economic disadvantage, personality traits, or psychological disorders. Risky or impulsive behaviors such as outward violence (e.g., Swogger et al., 2014) and speeding (e.g., Petridou & Moustaki, 2000) are also linked with suicide.

### **Development of the Life Attitudes Schedule Full and Short Forms**

Lewinsohn and colleagues (1995) developed the full Life Attitudes Schedule (LAS) and its alternative formats. Authors used a conceptual model hypothesizing an overall latent construct of “suicide proneness” encompassing life-threatening and life-enhancing thoughts, feelings and behaviors. Item selection was driven by a desire to cover death-related, injury-focused, health behavior, and self-concept domains. The four domains address both obvious (e.g., suicidal ideation) and less obvious (e.g., hitting things, smoking) self-destructive thoughts, feelings and behaviors. Final items were selected through a matrix-informed process ensuring equal content coverage of the four life-enhancing/threatening domains, including thoughts, feelings and behaviors. Authors tabulated scores for a three- (i.e., thoughts, feelings, behaviors) and four- (i.e., death, injury, self, health) factor structures, finding high intercorrelations between subscales and across administration of three LAS forms. Modest convergent validity was observed between LAS subscale scores with histories of accidental injury, intentional injury, and suicide

attempt ( $r_{\text{range}}$  .25 to .40). Confirmatory factor analyses (CFA) supported good fit for both the three- and four-factor structures in among U.S. high school students.

To streamline the LAS, Rohde and colleagues (1996) tested properties of a 24-item LAS-SF among American youth. Authors selected 24 items from a combination of content categories (death, injury, self, health), behavior type (thought, feeling, behavior), and item valence (positive versus negatively worded). Internal consistency values were acceptable for the total score (.84), but low for the behavior subtype (range .59 to .64) and content (.58 to .67) subscales. The LAS-SF total score correlated as expected with measures of depression ( $r = .43$ ) and hopelessness ( $r = .61$ ). Subscale correlation patterns with depression and hopelessness were only reported as averages across subscales. Although they were lower compared to total score correlations, LAS-SF subscale average correlations with measures of depression ( $r = .34$ ) and hopelessness ( $r = .50$ ) were in expected directions. An LAS-SF total cut-score of 10 best identified youth with lifetime suicidal ideation.

Rohde et al. (2003) proffered further evidence on the LAS-SF in a sample of youth across three U.S. states. Authors reported psychometric properties only for the LAS-SF total score. Men had higher (compared to women), and black youth (compared to all other races) had lesser, total scores. Further, the LAS-SF demonstrated the most meaningful and significant bivariate associations with depression ( $r = .48$ ), conduct problems ( $r = .42$ ), impulsivity ( $r = .44$ ), and family cohesion ( $r = .40$ ). The LAS-SF total score correlated with suicidal ideation ( $r = .35$ ) and attempt ( $r = .25$ ) in the expected direction. The total score accounted for significant variance in past suicide attempt. Finally, contrary to previous findings (Rohde et al., 1996), a cut-score of 8 maximized prediction of past suicide attempt.

More recently, factor analyses showed support for varying LAS-SF factor structures. Among U.S. school youth (Lewinsohn et al., 2004) CFA supported a two-factor model: physical unhealthiness (i.e., combination of the health- and injury-related subscales) and psychological death (i.e., combination of death- and self-related subscales). Among U.S. justice-involved youth living in a residential facility (Langhinrichsen-Rohling et al., 2012) both the one- and two-factor models had good-to-excellent model fit. However, Langhinrichsen-Rohling et al.'s analyses did not use item-level indicators within the CFA

models. Instead, they relied on death, injury, health, and self-related subscale scores as the indicators in each CFA. This simplified model approach containing less structural paths (and thus taking up less degrees of freedom) provides an alternative explanation to the acceptable fit of the two-factor model.

Importantly, the LAS-SF has been used to study suicide in relation to alcohol use (e.g., Lamis et al., 2010), child maltreatment (e.g., Arata et al., 2005), mental health intervention evaluation (e.g., Bowen et al., 2016), personality traits (Cramer et al., 2014), coping skills training (Rohde et al., 2004), and HIV-related stigma (Cramer et al., 2015). The promise of its utility is hampered by the gray picture of the best fitting LAS-SF factor structure across studies. In the present study, we seek to clarify the best fitting factor structure using a community UK adult sample.

The LAS-SF was developed as a tool to capture suicide proneness. Though its development shows promise, a number of gaps exist in the evaluation of the LAS-SF as a possible suicide screener or research/evaluation instrument. First, it was developed solely on American youth, with no psychometric testing among adult samples (beyond college students). Second, the LAS-SF has a mixed factor-analytic picture. The short form relies primarily on the suicide proneness conceptual model and full LAS CFA findings (Lewinsohn et al., 1995); moreover, LAS-SF CFA models did not use the items to assess competing factor structures. Finally, construct validation is limited to constructs such as suicidal ideation, depression, and impulsivity. Further mental health correlates (e.g., anxiety) may provide insight into the utility of the LAS-SF. We posited the following hypotheses: (H1) expected acceptable model fit for one- and two-factor LAS-SF models; (H2) positive correlations with measures of anxiety, depression, and suicidal ideation; and (H3) LAS-SF scores accounting for significant variance in suicidal ideation, suicide risk and depression risk, while controlling for demographic and mental health covariates.

## **Materials and Method**

### **Participants**

[Online supplement](#) table 1 summarizes sample demographic, mental health, and suicide descriptive statistics. The sample was primarily comprised of the following characteristics: young adult age (average about 30 years old; range 16-69 years old), women (80.5%), heterosexual persons (84.4%),

white race (89.5%), in a committed relationship (63.9%), and born in the United Kingdom (93.4%). Mental health and suicidal ideation sample average scores were in the following ranges: non-clinical depression (Kroenke et al., 2003), mild anxiety (mild; Spitzer et al., 2006), and non-clinical suicidal ideation (van Spijker et al., 2014). However, nearly 10% of the sample fell in the elevated clinical suicide risk group (van Spijker et al., 2014) and 30.7% fell in the clinically elevated depression category (Kroenke et al., 2003).

## **Procedure**

Ethical approval was obtained from the University of Strathclyde Ethics Board prior to commencing the study. Recruitment for this survey was distributed through social media (e.g., Facebook, Twitter) and university research participation listserv. The virtual survey advertisement included a short study description, inclusion and exclusion criteria, contact details for the researchers, and a survey link. Potential participants first encountered a study information summary and consent webpage that highlighted the sensitive nature of the study (i.e., about suicide and related health). The information page on the Qualtrics survey highlighted inclusion criteria that anyone living in the UK, aged 16 years or older, could take part irrespective of whether they had any previous experiences of suicidal ideation or behaviors. It also (a) informed them of the right to withdraw their data up until they pressed to submit the survey at the end, (b) provided relevant mental health support organizations before giving consent to take part in the study, and (c) included a check box affirming consent to participate. Individuals were not able to progress to the survey unless they provided consent. Participants could complete the survey in their own time (i.e., return to it at a later stage) and via a mode and location of their own choosing. Confidentiality and anonymity were further indicated by Qualtrics assignment of random ID numbers to participant responses; participants provided no identifiers. Upon affirming consent, participants engaged with the survey, which comprised study measures in a randomized order. Participants took an average of approximately 20-30 minutes to complete. The site provided written debriefing including being provided with contact details for the researchers, ethics committee, and mental health support organizations.

## **Measures**

**Demographics.** The demographics form queried age, gender, sexual orientation, race, birth country, and relationships status. Race was entered as a free text variable, then collapsed into categories (see Online supplement table 1). Sexual orientation and gender were indicated from a pre-determined checklist; both variables contained a response option of “other” followed by the opportunity to provide a self-description. Relationship status response options included single/not dating, casually dating, and in a committed relationship with one person. Birth country was indicated by a pre-set list of options and an “other” option. Birth country was reclassified to larger locations (see online supplement table 1).

**Life Attitudes Schedule-Short Form (LAS-SF; Rohde et al., 1996, 2003)** contains 24 true/false items measuring suicide proneness. Half of the items are phrased as life-threatening and half as life-enhancing thoughts, feelings, or behaviors. As summarized above, four variations in scoring exist. The total score has been the primary subject of psychometric reporting in development studies, with consistently acceptable internal consistency and expected validity relationship patterns. CFA work is limited on LAS-SF subscale models. Internal consistency values have varied based on factor structure or subscale use. For instance, the total score demonstrates acceptable internal consistency ( $\alpha_{\text{range}} = .80$  to  $.84$ ; Rohde et al., 1996, 2003), whereas subscales have demonstrated inadequate-to-acceptable values (e.g.,  $\alpha_{\text{range}} = .58$ -.71; Cramer et al., 2013, 2014; Rohde et al., 1996).

**Patient Health Questionnaire-2 (PHQ-2; Kroenke et al., 2003)** is a widely used two-item screener of depressive symptoms assessed over the last two weeks. Each item is rated on a four-point (0 to 3) scale. Items are summed for a total score, with a cut-score of 3 or higher demarcating clinically elevated depressive symptoms. Internal consistency was not reported for development samples. The PHQ-2 total score demonstrated expected validity patterns with characteristics such as perceived general health and depressive diagnoses. Internal consistency for the PHQ-2 total score in the present sample was  $.86$ . The PHQ-2 demonstrates strong predictive validity for depression- and suicide-related outcomes across samples (e.g., Donders & Darland, 2017; Richardson et al., 2010).

**Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006)** is a commonly used screener for seven generalized anxiety symptoms assessed over the last two weeks. Each item is rated on a four-point



(0-3) scale. Items are summed for a total score, with cut-scores demarcating clinical severity ranges possible (e.g., score of 10-14 is in the moderate anxiety range). Internal consistency was .92 in the development sample. Expected validity patterns with characteristics such as other self-report anxiety measures, as well as perceived general health and bodily pain. Internal consistency for the GAD-7 total score in the present sample was .91.

**Suicidal Ideation Attributes Scale (SIDAS;** van Spijker et al., 2014) is a 5-item screener capturing the nature of suicidal ideation within the last month. Each item is rated on an 11-point (0-10) scale. After item two is reverse-scored, items are summed for a total score. A cut-score of 21 or higher denotes clinically significant suicidal ideation. Internal consistency in the development sample of community-dwelling Australia adults was .91. The SIDAS total score demonstrated expected validity patterns with other measures of suicidal ideation and risk, as well as indicators of anxiety and depressive symptoms. The SIDAS demonstrates strong predictive validity with suicide-related outcomes (e.g., Harris et al., 2021). Internal consistency in the present sample was .91.

### **Data analysis**

Data preparation and an analysis plan can be found in the online supplement. For hypothesis 1 we employed a series of confirmatory factor analysis (CFA) models via MPlus v. 8.8 following recommended practices by software developers (Muthén & Muthén, 2017). Analyses for hypotheses 2 and 3 were conducted in SPSS v.28. For hypothesis 2 we employed Pearson correlations of LAS-SF (sub)scales retained after CFA with measures of suicidal ideation, depression, and anxiety. For hypothesis 3 we conducted a series of regression analyses.

### **Results**

**H1: Acceptable model fit for one- and two-factor LAS-SF models.** Table 1 contains CFA fit statistics for LAS-SAF factor models. The four factor model displayed good-to-excellent fit, whereas other models displayed inadequate-to-marginal model fit. Inspection of factor loadings for all models indicated that item 19 did not load significantly or meaningfully in any model ( $\lambda_{\text{range}} = .01$  to  $.04$ ,  $p_{\text{range}} = .64$  to  $.88$ ). Therefore, we re-ran all four LAS-SF models without item 19. Overall model fit did not

meaningfully change (see Table 1). The four factor LAS-SF model still displayed the superior fit compared to other models; thus, we retained this model for examination of study hypotheses 2 and 3. The LAS-SF subscales displayed the following properties: death-related ( $\lambda_{\text{range}} = .42$  to  $.95$ ,  $ps < .001$ ;  $\alpha = .68$ ), health-related ( $\lambda_{\text{range}} .23$  to  $.89 =$ ,  $ps \leq .002$ ;  $\alpha = .56$ ), injury-related ( $\lambda_{\text{range}} = .21$  to  $.94$ ,  $ps \leq .002$ ;  $\alpha = .56$ ), and self-related ( $\lambda_{\text{range}} = .50$  to  $.86$ ,  $ps < .001$ ;  $\alpha = .74$ ). Because suicide proneness theory (Lewinsohn et al., 1995; Rohde et al., 1996) supports an underlying suicide proneness construct, we tested a higher-order factor structure comprising the four factor model (still dropping item 19) with a second order single factor. Table 1 contains the fit statistics for this model. The higher order (one + four factor model) displayed good fit to the data. As such, we retained the total score for subsequent analyses where appropriate. The total score internal consistency in this sample was  $.83$ . Online supplement table 1 contains means and standard deviations for the final LAS-SF four-factor and total score scales (dropping item 19). Overall, H1 was unsupported; contrary to expectations, we found support for a four-factor + higher order LAS-SF structure.

**H2: LAS-SF score positive correlations with measures of anxiety, depression, and suicidal ideation.** Table 2 contains correlations between LAS-SF (sub)scales and measures of suicidal ideation, depression, and anxiety. LAS-SF subscales displayed small-to-moderate significant positive correlations with one another ( $r_{\text{range}} = .37$  to  $.67$ ,  $ps < .001$ ). LAS-SF (sub)scales demonstrated the following correlation patterns with suicidal ideation, depression, and anxiety: total score (moderate significant positive correlations), death-related (moderate significant positive correlations), health-related (small significant positive correlations), injury-related (moderate significant positive correlations), and self-related (moderate significant positive correlations). Overall, H2 was supported, although the health-related subscale displayed the weakest associations with measures of suicidal ideation, depression, and anxiety.

**H3: LAS-SF scores account for significant variance in suicidal ideation, suicide risk and depression risk.** Table 3 contains summary statistics for the regression models with outcomes of suicidal ideation (model 1), suicide risk (model 2) and depression risk (model 3). The set of variables accounted

for significant and large variance in suicidal ideation,  $F(8, 475) = 55.41, p < .001, \text{Adj. } R^2 = .47$ .

Depressive symptoms displayed a significant positive association with suicidal ideation. The following LAS-SF subscales showed significant positive associations with suicidal ideation: Death-related, injury-related, and self-related. All effects were small.

The set of variables accounted for significant large variance in suicide risk,  $\chi^2(8) = 143.93, p < .001$ , Cox & Snell  $R^2 = .26$ , Nagelkerke  $R^2 = .55$ . The model also fit well to the data, Hosmer & Lemeshow  $\chi^2(8) = 3.82, p = .87$ . The following LAS-SF subscales were associated with increased odds of suicide risk: Death-related and self-related. Depressive symptoms were also associated with increased odds of suicide risk. All effects were small.

The set of variables accounted for significant large variance in depression risk,  $\chi^2(7) = 275.17, p < .001$ , Cox & Snell  $R^2 = .43$ , Nagelkerke  $R^2 = .61$ . The model also fit relatively well to the data, Hosmer & Lemeshow  $\chi^2(7) = 16.81, p = .03$ . The following LAS-SF subscales were associated with increased odds of depression risk: self-related (small effect). Anxiety symptoms were also associated with increased odds of depression risk (moderate effect). H3 was partially supported. The LAS-SF self-related subscale was associated with all outcomes; death-related subscale was associated with suicidal ideation and suicide risk classification, and; injury-related subscale was associated with suicidal ideation. The health-related subscale was unassociated with outcomes of interest.

## Discussion

The primary aim of the present investigation was to test competing conceptually-driven models of the LAS-SF (derived from U.S. youth/young adult samples) in an adult UK sample. We examined a one-factor (Rohde et al., 1996, 2003), two-factor (i.e., physical unhealthiness and psychological death; Langhinrichen-Rohling et al., 2012; Lewinsohn et al., 2004), three-factor (i.e., thoughts, feelings, and behavior; Rohde et al., 1996), and four-factor (i.e., death-, health-, injury-, and self-related; Rohde et al., 1996) LAS-SF structure. The second study hypothesis tested LAS-SF construct validity through replication (i.e., depression, suicidal ideation) and extension (i.e., anxiety). Finally, we examined LAS-SF

subscale convergent validity by examining how subscales were associated with suicidal ideation, suicide risk, and depression risk while controlling for sexual orientation, gender, and mental health.

Limited prior LAS-SF psychometric analyses suggested support for one- and two-factor models (Lewinsohn et al., 2004; Langhinrichsen-Rohling et al., 2012). LAS-SF conceptualization of the nature of suicide proneness, on the other hand, supports one, three, and four factor models (Lewinsohn et al., 1995; Rohde et al., 1996). Our findings partially supported the suicide proneness conceptualization in that we found support for a four-factor model. However, we dropped one health-related item (number 19 regarding brushing teeth) from the model due to poor factor loadings. Moreover, adding a single underlying factor to the four factor model yielded equal fit. Where theory supports statistically equivalent models, it is best CFA practice to retain the theoretically supported model (Tellegen & Sellbom, 2019). In this case, we retained the higher order model. The revised LAS-SF (dropping item 19) can be seen in the online supplement.

A notable weakness to the resulting LAS-SF model is limited internal consistency. Three of four subscales possessed internal consistency values below .70. The trend in low internal consistency is consistent with prior LAS-SF studies in U.S. youth and clinical adult samples (e.g., Cramer et al., 2013, 2014; Rohde et al., 1996). The LAS-SF total score displayed acceptable internal consistency in our study, a result also consistent with prior research (Rohde et al., 1996, 2003). The low internal consistency is somewhat predictable given psychometric evidence routinely shows that internal consistency can be negatively impacted by having fewer than four response choices per item (e.g., Lozano et al., 2008).

Regarding construct validity, we found that three of four (death-, injury-, and self-related) subscales demonstrated significant moderate associations with mental health and suicidal ideation indicators. These patterns replicate prior findings regarding the LAS-SF total score with depression and suicidal ideation (Rohde et al., 2003). Other LAS-SF research has examined associations with similar constructs. For instance, Cramer and colleagues (2014) found that the total score correlated positively with suicidal cognitions (e.g., perceived burdensomeness) in a sample of urban-dwelling sexual minority adults in the U.S. Among American college students, depression explained a link between body image

and the LAS-SF total score (Lamis et al., 2010). An important advancement of our findings is the nuance in construct validity. Previous LAS-SF studies center on the total score. Our findings show that the health-related subscale may be the least linked portion of suicide proneness (as measured by the LAS-SF) to mental health and suicidal ideation. Also, anxiety-related findings suggest value in extending construct validity examination beyond known correlates.

The importance of our examination of nuance in LAS-SF subscales extends to regression model results. For instance, among youth samples, LAS-SF total scores of 10 have differentiated lifetime suicidal ideation (Rohde et al., 1996), and scores of 8 distinguished past suicide attempt (Rohde et al., 2003). In the present study, even when covarying for relevant demographics supported by international literature (e.g., sexual orientation; Marshall et al., 2011; Plöderl et al., 2013), LAS-SF subscales showed links with suicidal ideation, suicide risk, and depression risk. The self-related factor was relevant to all outcomes, whereas the death-related was linked to suicide-specific outcomes. The death-related subscale taps general thoughts about death, as well as beliefs about life expectancy and the value of suicide as a coping strategy. The self-related subscale captures a wide scope of negative self-criticism and self-beliefs. Placed in this context, it makes sense from both clinical and theoretical perspectives that these subscales are linked with suicidal ideation and risk. Clinically, Rudd and Bryan (2022) recommend asking about key risk factors (e.g., perceived burdensomeness) beyond suicidal ideation during a suicide risk interview. One's beliefs about death, suicide as coping, and negative self-schemas may warrant attention in such an interview. Likewise, both suicide-as-coping and the prevailing negative self-views are in line with the notion of entrapment (i.e., feeling an inability to escape one's own thoughts and/or social circumstances) within the Integrated Motivational-Volitional Model of Suicide (IMV; O'Connor & Kirtley, 2018).

Present findings raise a theoretical question pertaining to the nature of suicide proneness. LAS and LAS-SF development were founded on a conceptualization of suicide proneness holding two key tenets (Lewinsohn et al., 1995; Rohde et al., 1996, 2003). First, suicide proneness could be understood as a combination of life-threatening thoughts, feelings, and behaviors. Second, death, health, injury, and self focused domains are all theorized facets. Our findings do not support either the three- or four-facet notion

of suicide proneness. The thoughts, feelings, and behavior view was not supported. Despite CFA support, validity findings raise questions about the relevance of injury and health related suicide proneness within the four factor view. As a theoretical model of suicide, only the death and self domains appear relevant. In terms of support for LAS-SF theory, our findings provide grounding for the notion of psychological death (Lewinsohn et al., 2004), with the understanding that its measurement is best done using both subscales (i.e., separate scores for death- and self-related subscales under an overall psychological death latent variable). Finally, the underlying construct represented by the LAS-SF total score may be better labeled “self-destructive” or “unhealthy behaviors”, as opposed specifically to suicide proneness.

A corollary conceptual question concerns what exactly does the health-related subscale measure. The item content (e.g., alcohol use, eating habits) suggest a scale tapping a broad class of health behaviors. LAS-SF item 19 (regarding teeth brushing) dropped out of every model, including the model with the health-focused model. Including teeth brushing within measures of health behavior habits is consistent with other measures in the literature (e.g., Hampson et al., 2019), but may be less relevant among UK adults. Teeth brushing in a UK health behavior context may better be included in assessment of oral hygiene behaviors (e.g., Hill et al., 2013).

Our findings in combination with prior LAS-SF studies (e.g., Rohde et al., 1996, 2003) point to clinical assessment implications. Suicide screening instruments are one possible tool to integrate into a multi-modal suicide risk assessment (Rudd & Bryan, 2022). The LAS-SF death- and self-related subscales in particular may provide efficient screeners of suicide- or depression-specific risk factors. Alternatively, as mental health and suicide intervention efforts become a part of integrated healthcare settings (e.g., Das et al., 2016), the full LAS-SF may be a useful tool to capture multiple domains relevant to physical health, mental health/suicide, and health behaviors. In any instance of field application, the LAS-SF should be treated as one source of a comprehensive picture.

Psychometric results, theoretical suicide proneness refinement, and clinical implications inform a number of future research steps involving the LAS-SF. First, the psychological death construct warrants examination within the scope of contemporary suicide theories. Interestingly, the original articulation of

suicide proneness (Lewinsohn et al., 1995; Rohde et al., 1996, 2003) pre-dates current ideation-to-action suicide models (Klonsky et al., 2018). Future research should examine whether psychological death is related to other key constructs (e.g., entrapment), or can account for unique variance in suicide-related outcomes when accounting for these robust theoretically-based suicide drivers. Alternatively, consistent with predictions of ideation-to-action models, psychological death may be examined for its direct or moderating roles in the formation of suicidal ideation and transition from ideation to suicide attempt and death. Second, LAS-SF examination to date focuses on non-clinical, relatively lower suicide risk samples (e.g., high school youth, community dwelling adults). Future studies may test its psychometric properties and prospective associations with suicidal behavior among higher risk populations (e.g., patients upon psychiatric inpatient discharge; military service members).

The present study contained several limitations. First, the sample was homogenous with respect to race, age and gender. Life and death related attitudes and experiences may vary by age. Literature suggests that suicide attempt history is a critical factor in understanding risk (e.g., Rudd & Bryan, 2022). We did not account for this factor in the present study. As such, future LAS-SF research may incorporate attempt history in various ways such as measurement invariance testing. Our use of online non-probability sampling introduces multiple selection biases, potentially resulting in over- or under-representation of certain demographic groups (Lehdonvirta et al., 2021). Also, the online sample introduces possible error or bias in questionnaire responses. Finally, we observed low internal consistency values for several LAS-SF subscales. In total, these limitations provide alternative explanations for non-significant or unexpected findings. Conclusions should be taken with these caveats in mind.

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Table 1. Life Attitudes Schedule-Short Form Confirmatory Factor Analysis Model Fit Statistics

LAS-SF Model	$\chi^2$ (df), <i>p</i>	CFI	TLI	RMSEA (90% CI)	WRMR
1. LAS-SF one factor	908.19 (252), < .001	.89	.88	.07 (.07, .08)	1.72
2. LAS-SF one factor (no item 19)	893.89 (230), < .001	.89	.88	.08 (.07, .08)	1.77
3. LAS-SF two factor	732.80 (251), < .001	.92	.91	.06 (.06., .07)	1.53
4. LAS-SF two factor (no item 19)	717.07 (229), < .001	.92	.91	.07 (.06, .07)	1.58
5. LAS-SF three factor	848.89 (249), < .001	.90	.89	.07 (.06, .07)	1.66
6. LAS-SF three factor (no item 19)	833.88 (227), < .001	.90	.89	.07 (.07, .08)	1.71
7. LAS-SF four factor	565.14 (246), < .001	.95	.94	.05 (.05, .06)	1.31
<b>8. LAS-SF four factor (no item 19)</b>	<b>551.32 (224), &lt; .001</b>	<b>.95</b>	<b>.94</b>	<b>.05 (.05, .06)</b>	<b>1.34</b>
9. LAS-SF higher order: one + four factor model	563.20 (248), < .001	.95	.94	.05 (.04, .05)	1.31
<b>10. LAS-SF higher order: one + four factor model (without item 19)</b>	<b>548.93 (226), &lt; .001</b>	<b>.95</b>	<b>.94</b>	<b>.05 (.05, .06)</b>	<b>1.34</b>

Notes: LAS-SF=Life Attitudes Schedule-Short Form; One factor=total score; Two factor=Physical unhealthy & psychological death subscales; Three factor=Thoughts, feelings, and actions subscales; Four factor=Death-related, health-related, injury-related, & self-related subscales; df=Degrees of freedom; CFI= Comparative Fit Index; TLI=Tucker-Lewis Index; RMSEA=Root Mean Square Error of Approximation; CI=Confidence interval; WRMR=Weighted Root Mean Residual; **Bold** font denotes retained models.

Table 2. Life Attitudes Schedule-Short Form Scale Correlations with Mental Health Indicators

Variable	1	2	3	4	5	6	7	8
1. LASSF	-							
2. Death	<b>.81</b>	-						
3. Health	<b>.67</b>	<b>.39</b>	-					
4. Injury	<b>.75</b>	<b>.46</b>	<b>.37</b>	-				
5. Self	<b>.84</b>	<b>.67</b>	<b>.39</b>	<b>.47</b>	-			
6. SI	<b>.62</b>	<b>.58</b>	<b>.26</b>	<b>.46</b>	<b>.59</b>	-		
7. Dep	<b>.66</b>	<b>.57</b>	<b>.33</b>	<b>.44</b>	<b>.68</b>	<b>.62</b>	-	
8. Anx	<b>.59</b>	<b>.49</b>	<b>.31</b>	<b>.41</b>	<b>.59</b>	<b>.51</b>	<b>.73</b>	-

Notes: **Bold** font denotes  $p < .001$ ; LASSF=Life Attitudes Schedule-Short Form total score; Death=LAS-SF Death-related subscale; Health=LAS-SF Health-related subscale (without item 19); Injury=LAS-SF Injury-related subscale; Self=LAS-SF Self-related subscale; SI =Suicidal ideation (Suicidal Ideation Attributes total score); Dep=Depressive symptoms (Patient Health Questionnaire-2 total score); Anx=Anxiety symptoms (Generalized Anxiety Disorder-7 total score).

Table 3. Life Attitudes Schedule-Short Form Regression Models Predicting Suicidal Ideation, Suicide Risk, &amp; Depression Risk

Predictor:	Model 1: Suicidal Ideation		Model 2: Suicide Risk		Model 3: Depression Risk	
	B (S.E.)	$\eta_p^2$	B (S.E.)	OR (95% CI)	B (S.E.)	OR (95% CI)
<b>LAS-SF Death</b>	<b>2.23 (0.45)***</b>	<b>0.05</b>	<b>0.58 (0.24)*</b>	<b>1.79 (1.13, 2.84)</b>	0.25 (0.17)	1.28 (0.91, 1.79)
LAS-SF Health	-0.64 (0.35)	0.01	-0.06 (0.20)	0.94 (0.63, 1.40)	0.27 (0.15)	1.30 (0.97, 1.76)
<b>LAS-SF Injury</b>	<b>1.33 (0.37)***</b>	<b>0.03</b>	0.39 (0.22)	1.48 (0.96, 2.28)	0.23 (0.16)	1.25 (0.92, 1.71)
<b>LAS-SF Self</b>	<b>1.77 (0.50)***</b>	<b>0.03</b>	<b>1.03 (0.34)**</b>	<b>2.81 (1.45, 5.42)</b>	<b>0.88 (0.19)***</b>	<b>2.40 (1.64, 3.52)</b>
<b>Dep symptoms</b>	<b>2.21 (0.51)***</b>	<b>0.04</b>	<b>0.73 (0.28)**</b>	<b>2.07 (1.20, 3.55)</b>	-	-
Anx symptoms	0.75 (0.47)	0.00	0.24 (0.26)	1.27 (0.76, 2.13)	<b>1.30 (0.18)***</b>	<b>3.65 (2.56, 5.21)</b>
Man	0.21 (0.80)	0.00	-1.02 (0.53)	0.36 (0.13, 1.01)	0.30 (0.38)	1.35 (0.65, 2.83)
Heterosexual	-0.06 (0.89)	0.00	-0.93 (0.56)	0.35 (0.13, 1.18)	-0.52 (0.40)	0.59 (0.27, 1.31)
Constant	6.22 (0.84)***	.10	-3.23 (0.52)***	0.04 (-)	-1.58 (0.36)***	0.21 (-)

Notes: \*= $p < .05$ ; \*\*= $p < .01$ ; \*\*\*= $p < .001$ ; **Bold** font denotes significant predictor; B=Standardized regression weight; S.E.=Standard error; OR = Odds ratio; CI=Confidence interval; LAS-SF=Life Attitudes Schedule-Short Form; Death=LAS-SF Death-related subscale; Health=LAS-SF Health-related subscale (without item 19); Injury=LAS-SF Injury-related subscale; Self=LAS-SF Self-related subscale; Dep=Depressive (Patient Health Questionnaire-2 [PHQ-2] total score); Anx =Anxiety (Generalized Anxiety Disorder-7 [GAD-7] total score); Man=Woman is reference group; Heterosexual=Sexual minority is reference group; Suicidal Ideation=Suicidal Ideation Attributes Scale (SIDAS) total score; Suicide Risk=SIDAS cut score; Depression Risk=PHQ-2 cut-score.