Measurement Invariance of the 4-item Entrapment Scale Short-Form (E-SF): A Transnational Examination Across Race/Ethnicity, Sexual Orientation, and Suicide Attempt History Among Minoritized Adults

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Abstract

Feelings of entrapment—posited to arise when attempts to escape from defeating or humiliating circumstances are blocked—may confer increased risk for psychopathology and suicidal thoughts and behaviors (STB), particularly among minoritized individuals who often have more frequent exposure to such experiences. Including entrapment in empirical models may aid research efforts in further exploring its role in minority mental health. The Entrapment Scale Short-Form (E-SF), a brief version of the 16-item Entrapment Scale, is one tool that may be utilized towards this end; however, to do so meaningfully, its psychometric properties and measurement invariance must be evaluated in diverse samples. The current study aimed to examine the factor structure, measurement invariance, and convergent validity of the E-SF across race/ethnicity and sexual orientation in a combined transnational sample of minoritized adults (total $N = 1194$). Results supported a one-factor model of the E-SF that was invariant across samples, race/ethnicity, sexual orientation, and history of suicide attempt. Further, significant positive correlations observed between theoretically relevant constructs of anxiety, depression, and posttraumatic stress disorder symptoms supported its convergent validity. Implications include disproportionate levels of entrapment experienced by minoritized individuals—particularly by sexual minorities—which likely reflect the discrimination frequently endured by these individuals.

Keywords: entrapment; measurement invariance; race/ethnicity; sexual minorities; suicidality.

Public Significance Statement

We examined whether the Entrapment Scale Short-Form (E-SF) measured feelings of entrapment similarly across race/ethnicity, sexual orientation, suicide attempt history, and intersection of minoritized identities to determine the measure's usability across diverse groups. Results indicated such was the case. The E-SF also shared significant relationships with other measures of relevant psychopathology. Overall, findings support the E-SF as a reliable and valid measure of entrapment.

Introduction

Entrapment, which refers to the perception that one is powerless to escape from defeating or humiliating situations (Gilbert & Allan, 1998), has been implicated in the development and maintenance of various forms of psychopathology (Griffiths et al., 2014; Sloman, 2000; Taylor et al., 2011). Decades of theoretical and empirical works on arrested flight imply that entrapment confers risk for internalizing disorders through the malfunction of the *involuntary defeat strategy* (IDS; Siddaway et al., 2015; Sloman, 2000; Sloman et al., 2003; Taylor et al., 2011), which refers to the genetically hard-wired, temporary activation of affective, cognitive, and behavioral "entrapped defeat" that deescalate situations in which "fight" or "flight" may not be viable (e.g., to leave an abusive partner, cope with the loss of a job, or ask for help when injured). Under ideal circumstances, the IDS is assumed to only be active for a brief period of time and to deactivate following escape, obtaining help, or accepting a particular defeat in pursuit of new aspirations (Sloman, 2000); however, the perception of entrapment may become prolonged when IDS malfunctions and becomes intense, chronic, and/or inflexible. Inappropriate IDS activation (Nettle, 2004; Sloman et al., 2003; Taylor et al., 2011) has been implicated in the development and maintenance of various psychiatric disorders including depression (Gilbert, 2001; Gilbert & Allan, 1998; Price et al., 1994), anxiety disorders (Birchwood et al., 2007), and posttraumatic stress disorder (PTSD; Dunmore et al., 1997).

Because entrapment may exacerbate mental health outcomes of those who suffer from IDS malfunction, it may play a key role in the development of suicidal thoughts and behaviors (STBs; [O'Connor & Nock, 2014]). According to the integrated motivational-volitional (IMV) model of suicidal behavior—a tri-partite ideation-to-action theory—entrapment is central in the motivational phase (i.e., the phase in which suicidal ideation emerges; O'Connor & Kirtley,

2018). In this model, a foundational assumption is that entrapment mediates the pathway from defeat to suicidal ideation—which can, in turn, eventually transition into a suicide attempt—in that STBs occur when death by suicide becomes the only perceived way to escape defeat and/or humiliation (O'Connor & Kirtley, 2018). Indeed, there is evidence to support this mediation pathway of defeat-entrapment-suicidal ideation, which has been observed in a longitudinal sample of bipolar patients (Owen et al., 2018) and a sample of young adults (Wetherall et al., 2022). Taken together, the extant literature suggests that entrapment may be an important component in the development and maintenance of psychopathology as well as a direct driver of STBs specifically. As such, feelings of entrapment may be a critical maintaining factor and treatment target for individuals with internalizing disorders and STB risk, and its incorporation in case conceptualizations and routine assessment may benefit therapeutic intervention efforts (Zortea et al., 2021).

Entrapment and Minority Mental Health

Entrapment may be a particularly salient risk factor in minoritized individuals, whose increased risk for feelings of entrapment (Cramer et al., 2019; Rasmussen et al., 2021) may explain their disproportionate vulnerability toward internalizing disorders (e.g., Anderson & Mayes, 2010; Feinstein et al., 2023) and STBs (e.g., Karaye, 2022; Kerr et al., 2022). As demonstrated by previous research, repeated, chronic exposure to stressful life events and circumstances increases risk for feelings of entrapment (Brown et al., 1995). By nature, minority stressors (e.g., prejudice, discrimination, and victimization) and attendant minority stress (i.e., traumatic distress resulting from exposure to minority stressors that emotionally and psychologically threaten one's sense of self) are common, as highlighted by theories such as the minority stress model (Meyer & Frost, 2013) and stigma-based frameworks (Herek, 2016). As a

consequence, chronic minority stressors and accumulated minority stress may result in feelings of defeat (e.g., feeling beaten down; powerless), and ultimately, feelings of entrapment, which may explain, in part, the disproportionate rates of adverse mental health outcomes observed in minoritized groups. For example, minority stress based on race/ethnicity, sexual orientation, and gender has repeatedly demonstrated robust correlations with various forms of psychopathology, including depression (e.g., Pellicane & Ciesla, 2022), anxiety (e.g., Sosoo et al., 2020), PTSD (e.g., Livingston et al., 2019), and substance use disorders (e.g., Meyer, 1995, 2003; Testa et al., 2017). Further, prior work has demonstrated increased risk for suicidal thoughts and behaviors among individuals with minoritized gender (Horwitz et al., 2020; Kerr et al., 2022) and sexual orientation (Carson, 2018; Hottes et al., 2016). Given its assumed role in the development and maintenance of psychopathology and suicidal ideation, entrapment may serve as a critical psychological mechanism linking stressful negative life events including minority stressors (e.g., experiences of racism, homophobia, prejudice, discrimination) to psychopathology and suicidality for minoritized groups in particular (O'Connor, 2011; O'Connor & Kirtley, 2018).

The Entrapment Scale Short-Form

Despite entrapment being implicated in minority mental health, only a few studies have directly examined the construct of entrapment among diverse samples; therefore, it is unclear whether measures of entrapment can be used validly and reliably across identity dimensions. One new measure of entrapment that may help to assess its impact on minority mental health is the Entrapment Scale Short-Form (E-SF; De Beurs et al., 2020). The E-SF—which assesses experiences of unbearable thoughts and feelings (internal entrapment) as well as unbearable situations (external entrapment) from which one cannot escape—is a 4-item version of the 16-item Entrapment Scale (Gilbert & Allan, 1998), tailored to briefly assess entrapment among

individuals with elevated risk of suicide with whom using the 16-item version may not be feasible. Originally developed in a clinical sample of adults from two Scottish general hospitals and validated in a large population-based sample of young adults in Scotland, an initial evaluation showed the E-SF has a unidimensional structure, has good internal consistency, and is highly correlated with both the original 16-item Entrapment Scale as well as other measures related to psychopathology (e.g., depressive symptoms and defeat), both in the clinical sample as well as in the population-based sample (De Beurs et al., 2020).

Although the initial evaluation of the E-SF supported its psychometric robustness, to our knowledge its measurement properties have not yet been evaluated in diverse samples. According to established frameworks (Boer et al., 2018), measurement development should feature rigorous investigation including examination of the measure's factor structure and measurement invariance across identity dimensions, such as race/ethnicity and sexual orientation. Without such robust testing, it is not possible to determine whether the overall construct being assessed by a given measure is *invariant* or consistent across identity dimensions. Inaccurate conclusions may arise when groups are compared using a measure that does not assess the same construct across group characteristics, ultimately increasing the risk of misrepresenting or reinforcing biases against the groups being compared. The failure to abide by strict testing standards, typically a product of overreliance on non-diverse samples, has resulted in recent findings of non-invariance of "gold-standard" measures (e.g., Bagby et al., 2021; Borgogna et al., 2021), raising questions about research featuring such measures. As such, investigating the extent to which the E-SF accurately measures feelings of entrapment among minoritized individuals affords researchers and clinicians the opportunity to better understand its role in the onset and course of various forms of psychopathology broadly—and STBs

specifically—as well as to identify this construct as a treatment target and subsequently tailor current evidence-based treatments toward that end.

The Present Study

This study aimed to evaluate the psychometric properties of the E-SF in a combined transnational sample of minoritized adults by examining the following: (a) the factor structure of the E-SF, modeled as a one-factor structure; (b) measurement invariance of the E-SF across the two samples, race/ethnicity, sexual orientation, suicide attempt history, and intersection of minoritized identities; (c) correlations between the E-SF total score and measures of relevant forms of psychopathology, including depression, anxiety, and PTSD symptoms. Regarding the latter, we also aimed to test the clinical utility of the E-SF by examining whether it accounted for suicidal ideation severity above and beyond overall internalizing symptom variance.

Methods

Participants and Procedures

The present study utilized secondary data from two samples collected in the USA and UK. Sample 1 (n = 682) came from a larger cross-sectional online study on minority stress and mental health that was conducted at a Southeastern United States university between July 2022 to April 2024. All participants in this sample were above the age of 18 and had at least one minoritized identity (including minoritized race/ethnicity, sexual orientation, and/or gender identity). The study entailed completion of self-report questionnaires via Qualtrics, a secure online survey platform, and all study procedures were approved by the university's Institutional Review Board (IRB). Sample 2 (n = 512) came from a representative sample of people from across the UK (n = 3,077) recruited at the start of the COVID-19 pandemic (March 31 and April 9, 2020). The current study utilized data from this sample and included participants with at least

one minoritized identity (e.g., sexual orientation, race/ethnicity). Recruitment was conducted using quota sampling, incorporating parameters of age (18–24 years: 12%; 25–34: 17%; 35–44: 18%; 45–54: 18%; 55–64: 15%; ≥ 65: 20%), gender (women: 51%; men: 49%), socioeconomic grouping (SEG; AB: 27%; C1: 28%; C2: 20%; DE: 25%, based on occupation, where A, B and C1 are higher and categories C2, D, E are lower) and region of the UK (12 regions). Recruitment was conducted by inviting members of an existing online UK panel (Panelbase.net) to take part in an online survey investigating their health and well-being. See Table 1 for sociodemographic and clinical characteristics of the combined sample as well as of Samples 1 and 2 individually[1].

Measures

Entrapment-Short Form (E-SF; De Beurs et al., 2020). The E-SF is a four-item measure, modified from the original 16-item Entrapment Scale (Gilbert & Allan, 1998), that assesses feelings of entrapment.. The E-SF is comprised of two items assessing internal entrapment ("I feel trapped inside myself," and "I feel I'm in a deep hole I can't get out of") and two items assessing external entrapment ("I often have the feeling that I would just like to run away," and "I feel powerless to change things"). Items are rated on a 5-point scale (0 = *not at all like me*, 1 = *a bit like me*, 2 = *moderately like me*, 3 = *quite a bit like me*, and 4 = *extremely like me*), with higher scores indicating a higher degree of internal and external entrapment as experienced by the rater. Total scores range from 0 to 16. The initial evaluation of the E-SF demonstrated that it is a unidimensional measure with good internal consistency (De Beurs et al., 2020). The E-SF had good (ω = .88) and excellent (ω = .90) internal consistency in Samples 1 and 2, respectively and had good internal consistency in the combined sample (ω = .89).

[1] While Sample 1 includes information indicating whether participants identified as Hispanic/Latine, Sample 2 does not. Race/ethnicity was otherwise assessed similarly across the samples

Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 is a nine-item self-report measure assessing symptoms of a major depressive episode, such as "Little interest or pleasure in doing things" and "Poor appetite or overeating." Item 9, "Thoughts that you would be better off dead, or of hurting yourself," additionally refers to death and/or suicidal ideations. All items are rated from 0 to 3 (0 = *Not at all*, 1 = *Several days*, 2 = *More than half the days*, and 3 = *Nearly every day*), and total scores range from 0 to 27. In the present study, we examined correlations of the E-SF with the PHQ-9 total score, the total score excluding Item 9 (referred to as PHQ-8), and Item 9 alone. The combined sample had excellent internal consistency for both the PHQ-9 (ω = .93) and the PHQ-8 (ω = .93).

Generalized Anxiety Disorder Screener (GAD-7; Spitzer et al., 2006**).** The GAD-7 is a seven-item unidimensional scale used to screen for Generalized Anxiety Disorder. The measure has been validated in both primary care and general populations (Löwe et al., 2008; Spitzer et al., 2006). Items assess frequency of symptoms such as "Feeling nervous, anxious or on edge" and "Trouble relaxing," and each item is rated on a scale from 0 to 3 (0 = *Not at all*, 1 = *Several days*, 2 = *More than half the days*, and 3 = *Nearly every day*) for a total possible score of 21. The GAD-7 was used in both samples; however, in Sample 1, it was only available for n = 336 . In the combined sample, the GAD-7 had excellent internal consistency (ω = .94).

Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a 20-item measure of past-month DSM-5 PTSD symptoms that was administered in Sample 1. Items assess symptoms such as "Repeated, disturbing, and unwanted memories of the stressful experience" and "Being 'superalert' or watchful or on guard." Each item is rated on a scale from 0 to 4 (0 = *Not at all*, 1 = *A little bit*, 2 = *Moderately*, 3 = *Quite a bit*, and 4 = *Extremely*), for a total possible score of 80. The PCL-5 has been found to have good

psychometric properties across multiple studies (Ashbaugh et al., 2016; Blevins et al., 2015; Bovin et al., 2016a; Wortmann et al., 2016). In Sample 1, the PCL-5 had excellent internal consistency (ω = .95).

Depressive Symptom Index – Suicidality Subscale (DSI-SS; Joiner et al., 2002). The DSI-SS is a four-item measure that assesses suicidal ideation over the past two weeks. Each item uses a scale from 0 to 3 with anchor points relevant to the content of the question. For example, item 1 assesses frequency of suicidal ideation and uses the following anchor points: 0 = *I do not have thoughts of killing myself*, 1 = *Sometimes I have thoughts of killing myself*, 2 = *Most of the time I have thoughts of killing myself*, and 3 = *I always have thoughts of killing myself*. Items are summed for a total possible score of 12. Previous studies have determined that the DSI-SS is unidimensional and has good psychometric properties (Heath et al., 2022; Metalsky & Joiner, 1997; Ribeiro et al., 2012; Stanley et al., 2021). The DSI-SS was administered in Sample 1 only and had good internal consistency (ω = .90).

Beck Scale for Suicidal Ideation (BSS; Beck et al., 1988). The BSS consists of 19 items assessing suicidal ideation over the past week and two items assessing lifetime suicidal behavior. Each item is answered on a scale from 0 to 2 and, like the DSI-SS, has anchor points relevant to the content of the question. The 19 items of the measure that assess suicidal ideation were summed to create a total score of up to 38. Past studies evaluating the BSS have revealed good psychometric properties (Beck et al., 1988). The BSS was administered in Sample 1 only and had excellent internal consistency (ω = .90).

Suicidal intent. Finally, one question was administered in Sample 1 to assess for suicidal intent on a scale from 0% to 100%. This item is used in routinized suicide risk assessments according to the framework developed by Chu and colleagues (2015).

Past week suicidal ideation severity. In Sample 1, we also estimated a suicidal ideation severity factor score with the DSI-SS, BSS, and suicidal intent as indicators given previous work that noted differential responses across measures of suicidal thoughts and behaviors (Ammerman et al., 2021). In Sample 2, we used a single-item measure of overall suicidal ideation frequency in the past week ("How often have you thought about taking your life in the last week?"), with response options being the following: 1 = *Never*, 2 = *One day,* 3 = *Several days,* 4 = *more than half days,* and 5 = *Nearly every day*. While the reliance of a single-item measure of suicidal ideation severity may have limited measurement properties, a recent study has demonstrated its feasibility (Joiner et al., 2022) and another indicated frequency of suicidal ideation is the most prominent indicator of suicidal ideation severity in diverse samples (Jeon et al., in prep), providing some support of this item's use as a measure of suicidal ideation severity in Sample 2.

Data Analytic Approach

A series of factor analysis models were estimated to meet study aims using robust maximum likelihood (MLR) to account for nonnormality of E-SF items. Indicators were treated as continuous variables. The following robust goodness-of-fit indices were utilized to determine model performance: model chi-square values (χ^2), comparative fit index (CFI; Bentler, 1990; Savalei, 2018) and Tucker-Lewis Index (TLI; Brosseau-Liard & Savalei, 2014; Tucker & Lewis, 1973). We also determined model fit based on standardized root mean square residuals (SRMR; Bentler, 1995). Another commonly used fit metric includes the root mean square error of approximation (RMSEA; Steiger, 1990). However, the E-SF comprises of only four ordinal items and thus, all estimated models had limited degrees of freedom. Under such conditions, the RMSEA may have limited validity in determining model fit (Shi et al., 2020); thus, we did not determine model goodness-of-fit based on RMSEA values, although their values are reported.

We determined excellence of model fit based on the following values on selected fit indices, in accordance with Hu & Bentler (1999): CFI ≥ .95, TLI ≥ .95, and SRMR ≤ .08.

First, confirmatory factor analysis (CFA) was conducted to test the fit of the one-factor structure of the E-SF. The one-factor model featured all four items on the E-SF loading onto a single general factor. Second, measurement invariance of the E-SF was examined through conducting multigroup confirmatory factor analyses (MGCFAs). This entails estimating nested MGCFA models that vary in equality constraints of parameter estimates across groups, which are then compared on goodness-of-fit. Specifically, model fit was compared based on significant differences in chi-square ($\Delta\chi^2$) values according to Satorra and Bentler (2001). We also report alternative fit indices such as differences in CFI (ΔCFI), Akaike Information Criterion (ΔAIC), and SRMR (ΔSRMR). For each identity dimension examined for invariance, the following four MGCFA models were estimated and compared: (1) configural model, which allows free estimation of all parameters across groups; (2) metric (weak) invariance, which constraints factor loadings to be equal across groups; (3) scalar (strong) invariance, which constrains factor loadings and intercepts to be equal across groups; and (4) residual (strict) invariance, which constrains factor loadings, intercepts, and residuals to be equal across groups.

To enable fine-grained examination of invariance across identity dimensions, a combined sample was used for measurement invariance. However, to determine whether inherent differences in characteristics between the two samples would render the use of a merged dataset infeasible, we also tested for invariance across the two samples. Following this preliminary evaluation, we planned to examine invariance of the E-SF across race/ethnicity (White/European, Asian, Black/African American/Caribbean, Hispanic/Latine, or Multiracial) and sexual orientation (heterosexual, gay/lesbian, or bisexual, pansexual, queer, collectively

referred to as plurisexual). Given implications of entrapment in suicidal thoughts and behaviors, we also examined whether the E-SF significantly differed in factor structure between those with and without suicide attempt history. Only 4.51% (n = 55) individuals identified as a gender that was not cisgender woman or cisgender man in the combined sample; thus, we determined examination of invariance across gender would not be feasible and did not test for it.

Third, convergent validity (i.e., correlations between constructs determined to be theoretically relevant without a priori determining of magnitude of correlations) was tested by examining correlations between the E-SF factor score and measures of psychopathology and suicidal ideation. The psychopathology indices included measures of depression, anxiety, and PTSD symptoms. To account for non-normality of psychopathology variables in a community sample, Spearman's rank rho correlations are reported. Clinical utility of the E-SF was conducted by estimating structural equation path models in which the E-SF factor score and an internalizing symptom composite variable were regressed onto the past week suicidal ideation severity factor. The internalizing symptom composite variable was estimated as a latent variable with PHQ-8, GAD-7, and PCL-5 as indicators in Sample 1 and PHQ-8 and GAD-7 as indicators in Sample 2.

All analyses were conducted using the software R (R Core Team, 2021) and packages including *lavaan* (Rosseel et al., 2017), *Hmisc* (Harrell, 2022), and the base R package *stats.*

Transparency and Openness. Materials, analysis code, and analysis output for this study are available by emailing the corresponding author. The current study was not preregistered. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Results

Unstandardized and standardized factor loadings of factor analysis models, along with latent mean comparison results can be found in Table 2. All goodness-of-fit results of MGCFA models estimated for measurement invariance testing can be found in Table 3, 4, and 5.

Factor Structure and Feasibility of Combining Samples. The one-factor model had excellent fit in the combined sample (CFI = .999, TLI = .997, RMSEA = .031, SRMR = .009). Thus, we proceeded to examine measurement invariance of this model across the two samples to determine the feasibility of combining samples. All estimated MGCFA models had good fit. Of note, the scalar model had significantly worse fit compared to the metric invariance model ($\Delta\chi^2$ = 12.76, Δdf = 3, $\Delta\chi^2$ p = .005); however, comparison of the metric invariance and residual invariance model showed that the residual model did not fit worse than the metric invariance model ($\Delta\chi^2$ = 10.72, Δdf = 7, $\Delta\chi^2$ p = .826), supporting residual (strict) invariance of the one-factor E-SF model across samples. Thus, we proceeded to estimating MGCFA models in the combined sample.

Measurement Invariance Across Identity Dimensions. To summarize results, all estimated models demonstrated excellent fit in terms of CFI, TLI, and SRMR values. Results supported scalar (strong) invariance of the model across race/ethnicity, sexual orientation, and suicide attempt history, although residual (strict) invariance was not supported. Nonetheless, support for scalar (strong) invariance implies that the factor loadings and intercept values of the E-SF are comparable across race/ethnicity, sexual orientation, and suicide attempt history. This means that each item on the E-SF reflects feelings of entrapment comparably across race/ethnicity, sexual orientation, and suicide attempt history (metric or weak invariance) and higher scores on the four items reflect increases in the overall feelings of entrapment across

groups, which means we can reliably compare the factor score of the E-SF without being concerned about any items reflecting differing degrees of entrapment across race/ethnicity, sexual orientation, and suicide attempt history (scalar or strong invariance).

As scalar (strong) invariance was supported across all compared groups, we proceeded to conduct latent mean comparisons. Results showed no differences in entrapment severity between the two samples. Compared to individuals who identified as white/non Latine, POCs had significantly lower entrapment in our sample: White/non-Latine individuals had significantly higher entrapment scores than those who identified as Hispanic/Latine ($Z = -6.827$, $SE = .071$, $p < .001$), Asian ($Z = -5.851$, $SE = .076$, $p < .001$), Black/African American/Caribbean ($Z = -5.754$, $SE = .087$, $p < .001$), and multiracial ($Z = -2.624$, $SE = .110$, $p < .001$). No other differences in entrapment were noted across race/ethnicity. Comparison of latent means across sexual orientation showed heterosexual individuals had significantly lower entrapment scores compared to plurisexual individuals ($Z = 8.583$, $SE = .104$, $p < .001$) and gay/lesbian individuals ($Z = 4.502$, $SE = .119$, $p < .001$). Additionally, plurisexual individuals had significantly higher entrapment scores compared to gay/lesbian individuals ($Z = 2.574$, $SE = .108$, $p = .01$). Individuals who identified as both POC and heterosexual had significantly lower entrapment scores than those who identified as white/non-Latine and LGB+ ($Z = 8.271$, $SE = .100$, $p < .001$) and POC and LGB+ ($Z = 6.628$, $SE = .117$, $p < .001$), but there was no significant difference in entrapment scores between those who identified as POC and LGB+ and white/non-Latine and LGB+ ($p > .05$). Finally, those with a history of suicide attempt had significantly higher scores of entrapment compared to those who did not ($Z = 8.277$, $SE = .101$, $p < .001$).

Convergent Validity. Results of all correlation analyses conducted, as well as means and standard deviations of constructs examined for convergent validity, can be found in Table 5.

Briefly, all constructs examined for convergent validity shared significant and positive correlations with the E-SF factor score and its four items ($p < .001$).

Clinical Utility of the E-SF. Estimated structural equation models demonstrated good fit in both Sample 1 (CFI = .987, TLI = .982, RMSEA = .049, SRMR = .037) and Sample 2 (CFI = 1.00, TLI = 1.00, RMSEA < .001, SRMR = .012). The E-SF factor score significantly correlated with past week suicidal ideation severity in both Sample 1 (standardized $\beta = .669$, $p < .001$) and Sample 2 (standardized $\beta = .501$, $p < .001$), above and beyond internalizing disorder symptom severity, which did not share significant correlations with suicidal ideation after accounting for entrapment variance (p's > .05). We also tested the direct correlation between suicidal ideation severity and internalizing disorder symptom severity in the absence of entrapment, and results showed observed correlations were significant in both Sample 1 (standardized $\beta = .596$, $p < .001$) and Sample 2 (standardized $\beta = .479$, $p < .001$), suggesting that when accounting for significant correlations observed between entrapment and the internalizing symptoms composite variable in both Sample 1 (standardized $\beta = .834$, $p < .001$) and Sample 2 (standardized $\beta = .889$, $p < .001$), entrapment had substantial clinical utility as a correlate of suicidal ideation symptom severity.

Discussion

The present study examined the psychometric properties and measurement invariance of the E-SF across a combined diverse adult sample of individuals with at least one minoritized identity based on race/ethnicity, gender, and sexual orientation. We examined the scale's factor structure, measurement invariance across race/ethnicity, sexual orientation, and suicide attempt history, as well as its convergent validity with other relevant constructs.

Overall, results supported the psychometric properties of the E-SF in diverse samples. Consistent with work by De Beurs and colleagues (2020), our results supported an excellent one-factor structure of the E-SF, which had good fit in both samples separately as well as in the combined sample. Results also indicated scalar (strong) invariance across race/ethnicity, sexual orientation, and history of suicide attempt, indicating that the E-SF demonstrated the same pattern of factor loadings and intercepts across race/ethnicity, sexual orientation, and suicide attempt history. Of due emphasis, the E-SF demonstrated residual (strict) invariance between the two samples, which demonstrates transnational invariance of the E-SF. While the comparison of the latter is limited to two countries in which English is the dominant language, it nonetheless constitutes another layer of identity that was tested for invariance in our study and further supports the psychometric properties of the E-SF. Taken together, our findings suggest that the E-SF holds across race/ethnicity, sexual orientation, and suicide attempt history, that each item contributes towards the underlying factor in the same way across groups, and that higher rates of endorsement on each of the four items reflect increases in the degree to which an individual perceives feelings of entrapment comparably across groups. While strict invariance of the E-SF was not supported across identity factors, this is typically regarded as unnecessary in establishing measurement invariance (Van De Schoot et al., 2015), as equivalence in residual variance of individual items is not meaningful when the purpose of the measure is interpretation of the sum score, or factor score. Taken together, these findings lend support for the E-SF as an acceptable measure of entrapment across various identity factors, including race/ethnicity and sexual orientation.

Support of invariance of the E-SF enabled latent mean comparisons, and results showed that white/non Latine sexual minority individuals experienced particularly high levels of

entrapment. From the perspective of the IMV model (O'Connor & Kirtley, 2018), this suggests that the experience of sexual minority status, and the subsequent perceived prejudice and stigma, creates an entrapping situation that may lead to the emergence of suicidal ideation. Certain minority groups may be particularly susceptible to minority stress and consequentially report stronger feelings of entrapment. Within the context of our findings, having a minoritized sexual orientation was particularly salient in that no differences were observed between non-white sexual minorities vs white sexual minorities. The findings fit with LGBTQ+ young people's description of 'queer entrapment' as a driver of suicidal distress (Marzetti et al., 2022). It should be noted that due to the requirement that all participants had at least one minoritized identity based on race/ethnicity, gender, and sexual orientation, and all gender minorities also identified as a sexual minority, all white/non Latine individuals, by nature, identified as a sexual minority. Thus, a more nuanced interpretation of our results should not be that white/non Latine individuals are more likely to experience entrapment than POCs, but that sexual minorities may experience feelings of entrapment more so than racial/ethnic minorities. Our findings are also consistent with previous research findings that sexual minorities report higher levels of entrapment. As noted in our study, bisexual individuals were more likely to report entrapment than their gay/lesbian counterparts, which is congruent with previous work (Rasmussen et al., 2021). This may be due to bisexual individuals being subject to unique discrimination experiences that involve invalidation of their bisexual identity that their gay/lesbian counterparts may not experience (e.g., Feinstein et al., 2019).

Our findings also provide meaningful clinical implications that are worth elaboration. First, the convergent validity of the E-SF suggests that entrapment is moderately to strongly correlated with various internalizing disorders such as depression and anxiety, as noted by

significant correlations between the E-SF factor score and internalizing disorder symptoms, measured by each measure independently and as a latent factor of overall internalizing symptoms. This is consistent with a meta-analysis that used data from forty studies and found entrapment to be strongly associated with depression, anxiety problems, PTSD, and suicidality (Siddaway et al., 2015). Our findings imply that entrapment is transdiagnostic; it may be a feature of psychopathology more broadly and may be relevant to clinical care for these disorders. More importantly, our findings show entrapment is an important correlate of suicidal ideation, above and beyond overall internalizing symptom variance. Internalizing symptoms are often included as a risk factor of suicide in risk assessments, and our findings show that entrapment is likely to supply additional, incremental information beyond internalizing measures. Thus, assessment of entrapment may prove to be beneficial in accurate measurement of suicide risk.

Future work should also examine entrapment and suicide risk to determine the temporal nature of their relationship. If entrapment adds incremental predictive power for future suicide risk, and especially if causal relationships are detected, entrapment may be a valuable target in therapeutic interventions for suicidal thoughts, as has previously been suggested (Sandford et al., 2022). Some existing work has already provided evidence for the utility of targeting entrapment, particularly internal entrapment during crisis-focused psychotherapy in moderating symptom distress (Tzur Bitan et al., 2019); future work should determine if targeting entrapment reduces distress in treatment of psychopathology more broadly.

Although the present study had many strengths, there are a few limitations that should be addressed in future studies. First, there were differences between samples in how self-identified race was assessed, defined, and categorized. For example, Sample 1 assessed ethnicity (Hispanic/Latine versus non-Hispanic/Latine) while Sample 2 did not. This is due, in part, to

different demographic compositions and guidelines on how best to assess demographic categories in the USA versus the UK. Still, this introduces some difficulty in comparing differences in race/ethnicity in the combined sample. Second, although our sample was large and had a significant amount of diversity in race/ethnicity and sexual orientation, we were unable to conduct more fine-grained measurement invariance analyses, examining the intersections between specific sexual orientations (e.g., gay/lesbian vs. bisexual/pansexual) and specific racial/ethnic identities. As previously mentioned, we did not detect differences in levels of entrapment between non-White and White sexual minorities. Had we been able to examine race and sexual orientation as non-dichotomous variables, differences may have emerged.

Additionally, we were unable to examine measurement invariance of the E-SF across gender identity due the small number of transgender and gender-diverse participants in the combined sample. While prior studies have also been unable to examine invariance across gender identity for similar reasons, they have demonstrated that transgender and gender-diverse individuals experience higher levels of entrapment (Cramer et al., 2023). Given the relevance and higher rates of entrapment in transgender and gender-diverse populations, it is imperative that future studies examine psychometric properties of measures of entrapment in transgender and gender-diverse samples. Similarly, given that the median age range of our combined sample was 18-24, children and middle-to-older aged adults remain unrepresented and unexamined in this work. Overall, although our combined sample had a significant amount of diversity, it was derived from two convenience samples, one composed largely of university students. Thus, the samples may not be representative of all groups, and continued research is necessary.

Finally, while results support the E-SF as unidimensional in its factor structure, future work should examine internal and external entrapment separately across diverse samples. This

may especially be warranted in the context of clinical applications of the E-SF, as distinguishing between internal and external motivators for feelings of escape could result in more tailored treatment interventions for at-risk individuals (De Beurs et al., 2020).

Limitations notwithstanding, the current work provides initial support for the use of the E-SF in assessing feelings of entrapment across diverse identity factors, including race/ethnicity and sexual orientation, ultimately extending its generalizability and applicability in the assessment and comparison of entrapment among individuals with one or both of these minoritized identities. While further work is needed to better understand entrapment as it pertains to diverse populations as well as its relationship to minority mental health more broadly, the current study serves as an initial step in providing evidence for the utility of the E-SF in doing so.

Table 1. Sample sociodemographic and clinical characteristics.

	Combined Sample (N = 1194)		Sample 1 (n = 682)		Sample 2 (n = 512)	
	N	%	N	%	N	%
Median Age Range	18-24		18-24		30-34	
Race						
White/European	357	29.90%	137	20.09%	220	42.97%
Black/African American/Caribbean	255	21.36%	93	13.64%	162	31.64%
Asian or Pacific Islander	149	12.48%	81	11.88%	68	13.28%
Hispanic/Latine	307	25.71%	307	45.01%		
Multiracial	101	8.46%	49	7.18%	52	10.16%
Other	25	2.09%	15	2.20%	10	1.95%
Sexual Orientation						
Heterosexual/straight	672	56.28%	397	58.21%	275	53.71%
Gay/Lesbian	165	13.82%	62	9.09%	103	20.12%
Bisexual/Pansexual	273	22.86%	156	22.87%	117	22.85%
Asexual	25	2.09%	21	3.08%	4	0.78%
Queer	35	2.93%	35	5.13%	0	0.00%
Other	6	0.50%	1	0.15%	5	0.98%
Questioning	10	0.84%	10	1.47%	0	0.00%
Gender						
Woman	797	66.75%	523	76.69%	274	53.52%
Man	345	28.89%	109	15.98%	236	46.09%
Nonbinary/genderqueer/gender expansive	43	3.60%	41	6.01%	2	0.39%
Other	2	0.17%	5	0.73%	0	0.00%
Questioning	5	0.42%	2	0.29%	0	0.00%
Transgender						
Yes	25	2.09%	22	3.23%	3	0.59%
No	1156	96.82%	647	94.87%	509	99.41%
Questioning	13	1.09%	13	1.91%	0	0.00%
Intersections of race/ethnicity and sexual orientation						
POC/heterosexual	665	55.70%	390	57.18%	275	53.71%
White/LGB+	344	28.81%	130	19.06%	214	41.80%
POC/LGB+	170	14.24%	155	22.73%	15	2.93%
Clinical characteristics						
Depression	622	52.09%	238	34.90%	384	75.00%
Anxiety	465	38.94%	115	16.86%	350	68.36%
Posttraumatic stress disorder (PTSD)			183	26.39%		
History of Suicide Attempt	204	17.09%	112	16.42%	92	17.97%

Note. Age data was collected categorically for Sample 2; therefore, we report the median age range for both samples and the combined sample. Median annual household income was $75,000 to $99,999 for Sample 1 and was not available for Sample 2. Clinical characteristics were determined based on the following empirically determined cutoff values (Bovin et al., 2016b; Plummer et al., 2016; Wu et al., 2020): Depression as PHQ-9 ³ 10, anxiety as GAD ³ 8, PTSD as PCL-5 ³ 33. The PCL-5 was only available for Sample 1. GAD information was missing from Sample 1 for n = 343 who were not given the GAD-7; n = 42 of sample 1 was not administered the PCL-5; one person did not complete the BSS in Sample 1; history of suicide attempt information was missing for n = 21 in Sample 2.

Table 2. Factor loadings of estimated factor models and latent mean comparison results.

	Combined sample (n = 1194)		Sample 1 (n = 682)		Sample 2 (n = 512)		History of suicide attempt (n = 204)		No history of suicide attempt (n = 969)		Heterosexual (n = 672)		Plurisexual (n = 308)		Gay/lesbian (n = 165)	
	Loadings		Loadings		Loadings		Loadings		Loadings		Loadings		Loadings		Loadings	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Item 1	1.006	.723	.910	.681	1.120	.760	.706	1.026	.934	.699	.879	.704	.969	.660	1.057	.723
Item 2	.998	.797	.927	.781	1.067	.804	.844	1.132	.901	.765	.875	.772	.978	.757	1.037	.809
Item 3	1.214	.882	1.188	.887	1.261	.887	.893	1.304	1.109	.863	1.030	.876	1.233	.861	1.311	.883
Item 4	1.143	.880	1.073	.866	1.216	.890	.854	1.244	1.051	.877	.964	.865	1.162	.840	1.296	.915
Latent mean comparisons																
M (SE)	NA	NA	.000	.000	.12	.068	.835	.101	.000	.000	.000	.000	.892	.104	.537	.119
Z (*p* value)					1.762	.078	8.277	< .001					8.583	< .001	4.502	< .001
M (SE)											-.756	.072	.000	.000	-.301	.108
Z (*p* value)											-10.501	< .001			-2.779	.005
M (SE)											-.421	.078	.279	.108	.000	.000
Z (*p* value)											-5.38	< .001	2.574	.01		

	White/ European (n = 382)		Hispanic/Latine (n = 307)		Asian (n = 255)		Black/Caribbean/ African American (n = 204)		Multiracial (n = 101)		POC and heterosexual (n = 665)		White and LGB (n = 344)		POC and LGB (n = 170)	
	Loadings		Loadings		Loadings		Loadings		Loadings		Loadings		Loadings		Loadings	
	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.	Unstd.	Std.
Item 1	1.087	.723	.896	.694	.977	.734	.881	.490	.857	.655	.890	.709	1.087	.723	.824	.596
Item 2	1.041	.795	.918	.793	.895	.761	.823	.687	1.057	.824	.872	.768	1.041	.795	.938	.746
Item 3	1.278	.854	1.135	.897	1.110	.876	1.120	.890	1.237	.924	1.025	.878	1.278	.854	1.250	.896
Item 4	1.250	.879	.942	.825	1.145	.902	1.025	.896	1.207	.918	.956	.861	1.250	.879	1.183	.868
Latent mean comparisons																
M (SE)	.000	.000	-.482	.071	-.447	.076	-.501	.087	-.289	.110	.000	.000	.825	.100	.775	.117
Z (*p* value)			-6.827	< .001	-5.581	< .001	-5.754	< .001	-2.624	.009			8.271	< .001	6.628	< .001
M (SE)	.587	.108	.000	.000	.043	.093	-.024	.105	.236	.138	-.657	.063	.000	.000	-.040	.095
Z (*p* value)	5.424	< .001			.460	.646	-.224	.823	1.712	.087	-10.357	< .001			-.416	.677
M (SE)	.512	.107	-.040	.086	.000	.000	-.063	.103	.181	.133	-.665	.083	.043	.103	.000	.000
Z (*p* value)	4.779	< .001	-.471	.637			-.605	.545	1.362	.173	-8.014	< .001	.413	.680		
M (SE)	.610	.136	.024	.106	.066	.114	.000	.000	.259	.155						
Z (*p* value)	4.487	< .001	.221	.825	.583	.560			1.671	.095						
M (SE)	.306	.134	-.205	.106	-.168	.112	-.226	.119	.000	.000						
Z (*p* value)	2.282	.022	-1.929	.054	-1.496	.135	-1.901	.057								

*Note: Factor loadings are reported for the residual (strict) invariance model for the multigroup confirmatory factor analysis conducted across samples, and for scalar (stong) invariance models for all other group comparisons. Unstd = Unstandardized; Std. = Standardized. Group with M (SE) equal to 0 respectively refers to the focal group for comparisons.

Table 3. Measurement invariance results across sample and race/ethnicity.

	Sample (Sample 1 vs Sample 2)				Race/ethnicity (White/European vs. Asian vs. African American/Black/Caribbean vs Hispanic/Latine vs Multiracial)			
Fit index	Configural	Metric	Scalar	Residual*	Configural	Metric	Scalar	Residual
χ^2	8.73	13.90	26.98	29.93	20.27	35.42	50.61	99.08
df	*4*	7	*10*	*14*	*10*	22	*34*	*50*
CFI	0.999	0.998	0.995	0.996	0.998	0.997	0.996	0.987
TLI	0.997	0.997	0.994	0.997	0.993	0.996	0.996	0.992
AIC	13315	13314	13321	13316	13031	13022	13013	13030
RMSEA	0.035	0.034	0.050	0.036	0.051	0.039	0.037	0.055
SRMR	0.009	0.022	0.027	0.028	0.012	0.034	0.039	0.042
Δdf		3	3	7		12	12	7
$\Delta\chi^2$		4.87	13.15	11.38		13.47	14.96	31.39
ΔCFI		-0.001	-0.001	-0.001		0.001	0.001	0.009
ΔAIC		1	-7	5		-9	-9	17
ΔSRMR		0.013	0.005	0.001		0.022	0.005	0.003
$\Delta\chi^2$ *p*		0.182	0.004	0.123		0.336	0.244	0.012

Table 4. Measurement invariance results across sexual orientation and suicide attempt history.

	Sexual Orientation (heterosexual vs plurisexual vs gay/lesbian)				History of suicide attempts (HxSA vs no HxSA)			
Fit index	Configural	Metric	Scalar	Residual	Configural	Metric	Scalar	Residual
χ^2	10.41	14.69	20.34	89.93	16.42	18.49	19.81	37.83
df	6	12	18	26	4	7	10	14
CFI	0.999	1	1	0.976	0.995	0.996	0.997	0.992
TLI	0.997	1	1	0.983	0.987	0.993	0.996	0.993
AIC	12287	12279	12273	12326	12956	12952	12947	12957
RMSEA	0.031	0.012	0.001	0.077	0.068	0.050	0.038	0.051
SRMR	0.010	0.023	0.025	0.038	0.013	0.018	0.019	0.021
Δdf		6	6	8		3	3	4
$\Delta\chi^2$		4.52	5.37	42.87		2.44	1.19	14.33
ΔCFI		-0.001	0	0.024		-0.001	-0.001	0.005
ΔAIC		-8	-6	53		-4	-5	10
ΔSRMR		0.013	0.002	0.013		0.005	0.001	0.002
$\Delta\chi^2$ *p*		0.606	0.498	< .001		0.486	0.756	0.006

Table 5. Measurement invariance results across intersection of race/ethnicity and sexual orientation.

	Intersection of race/ethnicity and sexual orientation (White/LGB vs POC/heterosexual vs POC/LGB)			
Fit index	Configural	Metric	Scalar	Residual
χ^2	10.01	18.36	27.07	95.64
df	6	12	18	26
CFI	0.999	0.999	0.998	0.975
TLI	0.998	0.998	0.998	0.983
AIC	13128	13124	13121	13173
RMSEA	0.024	0.028	0.029	0.079
SRMR	0.010	0.027	0.030	0.040
Δdf		6	6	8
$\Delta\chi^2$		8.34	8.29	47.32
ΔCFI		0	0.001	0.023
ΔAIC		-4	-3	52
ΔSRMR		0.017	0.003	0.010
$\Delta\chi^2$ *p*		0.214	0.218	< .001

Table 6. Means, standard deviations, and correlations observed between the E-SF, psychopathology, and suicidal ideation.

		n	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	E-SF Factor Score	1194	3.84	3.80	-											
2	E-SF Item 1	1194	1.29	1.39	0.81	-										
3	E-SF Item 2	1194	1.23	1.25	0.85	0.60	-									
4	E-SF Item 3	1194	1.17	1.38	0.91	0.63	0.69	-								
5	E-SF Item 4	1194	1.01	1.30	0.90	0.62	0.70	0.78	-							
6	PHQ-9	1194	11.89	7.71	0.61	0.50	0.54	0.52	0.55	-						
7	PHQ-8 (excluding item 9)	1194	11.16	7.05	0.61	0.50	0.55	0.53	0.55	1.00	-					
8	PHQ-9 Item 9	1194	0.73	0.90	0.42	0.35	0.37	0.34	0.40	0.76	0.70	-				
9	GAD-7	853	11.08	6.50	0.69	0.58	0.61	0.62	0.62	0.82	0.82	0.62	-			
10	PCL-5	641	22.17	17.56	0.59	0.51	0.47	0.53	0.52	0.66	0.65	0.36	0.66	-		
11	DSI-SS	682	0.79	1.60	0.54	0.42	0.43	0.47	0.51	0.50	0.46	0.71	0.32	0.39	-	
12	BSS	676	2.29	3.79	0.55	0.44	0.42	0.50	0.53	0.49	0.45	0.64	0.38	0.39	0.78	-
13	Suicidal Intent	680	0.31	0.77	0.43	0.31	0.36	0.38	0.41	0.40	0.36	0.53	0.24	0.31	0.65	0.70

*Note. All observed correlations were significant at $p < .0001$.

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