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## Measurement invariance of the Grief Facilitation Inventory with respect to youth gender, race, ethnicity, and age

Lauren Alvis<sup>a</sup> , Benjamin Oosterhoff<sup>a</sup>, Rebecca Hoppe<sup>b</sup>, Christopher Giang<sup>c</sup>, and Julie B. Kaplow<sup>a,d</sup>

<sup>a</sup>The Trauma and Grief Center, Meadows Mental Health Policy Institute, Houston, TX, USA; <sup>b</sup>Department of Psychology, Virginia Commonwealth University College of Humanities and Sciences, Richmond, VA, USA; <sup>c</sup>Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, MI, USA; <sup>d</sup>Department of Psychiatry, Tulane University School of Medicine, New Orleans, LA, USA

### ABSTRACT

The Grief Facilitation Inventory (GFI) assesses caregiver grief facilitation behaviors among bereaved youth. Initial analyses supported the GFI's reliability and validity. The purpose of this study was to evaluate measurement invariance of the GFI across gender, race/ethnicity, and age. Participants were 558 clinic-referred youth aged 7–18 (58.8% female; 43.6% Latino(a), 24.9% White, 14.9% Black, 16.6% Multiracial). Multigroup confirmatory factor analyses provided evidence of measurement invariance for ongoing connection, caregiver grief expression, and existential continuity and support—but not grief inhibition/avoidance—across subgroups. Results suggest that ongoing connection, caregiver grief expression, and existential continuity and support are measuring similar constructs, to a similar degree, across demographics, thereby supporting generalizability and clinical utility of these subscales. The grief inhibition/avoidance subscale should be used with caution and interpreted in the context of low reliability for Black, Latino(a), and younger youth, with further research needed to improve conceptualization and measurement of this subscale.

The death of a loved one is one of the most commonly reported and most distressing forms of trauma among youth (Kaplow et al., 2010). Children's capacity to cope and navigate bereavement hinges on the support they receive from the adults around them, making the caregiving context one of the most critical factors in facilitating healthy adaptation after a death (Kaplow et al., 2012; Alvis et al., 2022; Wardecker et al., 2017). Studies have identified several positive caregiver behaviors that are related to improved child outcomes following the death of a loved one, including caregiver warmth (Kaplow et al., 2014), open and supportive communication (Sandler et al., 2010; Haine et al., 2008), and maintaining routines (Sandler et al., 2010). Conversely, behaviors that involve avoiding or suppressing grief reactions can impede the healthy grieving process (Kaplow et al., 2023; Shear, 2012).

Recognizing the significance of caregivers' grief-related actions for child bereavement, the Grief Facilitation Inventory (GFI; Kaplow & Layne, 2012) was developed to assess caregivers' engagement in bereavement-specific behaviors theorized to influence

youths' grief reactions. Parallel child- and caregiver-report GFI items were developed based on childhood bereavement literature, clinical expertise, and feedback from providers specializing in the treatment of bereaved youth. The initial validation of the GFI (Alvis et al., 2022) identified four distinct factors based on exploratory factor analyses of the child-report items: Ongoing Connection (efforts to help their child maintain closeness with the deceased person); Existential Continuity and Support (efforts to provide reassurance of a positive future); Caregiver Grief Expression (caregivers sharing their own grief with their child); and Grief Inhibition/Avoidance (efforts to suppress or evade the child's grief reactions). Scores for both the child- and caregiver-reports showed acceptable internal consistency. Child-reported GFI factors were significantly correlated with child-reported maladaptive grief reactions, providing preliminary evidence of criterion-referenced validity. To date, the GFI represents the only empirically validated measure of caregiver grief facilitation for youth. Although these results support the GFI's reliability, validity, and

clinical utility, additional research is required to assess its psychometric properties across diverse bereaved youth populations.

Measurement invariance (MI) can be used to evaluate a measure's generalizability, and, when achieved, ensures the meaningfulness and validity of intergroup comparisons on a given construct. MI involves three sets of analyses. First, configural invariance evaluates if the factor structure of the measure remains consistent across groups, implying that the same items are linked to each behavior cluster (Brown, 2006). If configural invariance is not met, the theoretical model—including the presumed relations between items and latent constructs—may not be universally applicable, signaling the need to reevaluate the relevance and appropriateness of the measure across diverse groups. Second, metric invariance assesses whether the relations between items and their factors remain consistent across groups (Brown, 2006). If metric invariance is violated, observed items may not equally reflect intended constructs across groups, compromising the validity of comparisons. Third, scalar invariance examines if groups show similar levels of latent constructs when observed items are at a reference point (e.g., intercepts; Brown, 2006). If scalar invariance is violated, it implies systematic differences in how groups endorse or respond to specific items.

The primary aim of this study is to evaluate the GFI's psychometric qualities among a large racially and ethnically diverse sample of bereaved youth. This study uses MI testing to determine if the GFI captures the same constructs consistently across different demographic groups. MI of the GFI was evaluated with respect to gender (boys and girls), race/ethnicity (Latino(a)/Hispanic, White, Black, and Multiracial youth), and age (late childhood, pre-adolescent, and adolescent youth). Group differences in mean GFI factor scores were also evaluated with respect to gender, race/ethnicity, and age.

## Method

### Participants and procedure

Participants came from two outpatient youth clinics. Sample 1 included 325 bereaved from an outpatient clinic for trauma-exposed and/or bereaved youth housed in a large academic medical center. Sample 2 included 233 bereaved youth referred to a community-based grief support center that provides individual and group counseling for bereaved families. The combined sample included 558 youth aged

7–18 years ( $M = 12.65$ ,  $SD = 2.86$ ); 58.8% female, 40.7% male, <1% identified as another gender; 43.6% identified as Latino(a)/Hispanic; 24.9% White; 14.9% Black; and 16.6% Multiracial. The most common cause of death was long-term illness (e.g., cancer;  $n = 194$ , 34.8%), followed by sudden natural death (e.g., heart attack;  $n = 94$ , 16.8%), an accident ( $n = 77$ , 13.8%), suicide ( $n = 64$ , 11.5%), homicide ( $n = 64$ , 11.5%), and other ( $n = 65$ , 11.6%). The average time since the death was 2 years ( $SD = 2.4$ ). Youth completed a standardized battery of self-report measures at intake that included those reported in this study. Trained clinicians read all measures aloud to participants. Youth were compensated for their participation in accordance with the respective clinic's established protocols. All procedures were approved by the senior author's institutional review board. Parents or legal guardians and youth 18 years of age or older provided informed consent and children aged under 18 years provided informed assent to participate in the study before completing the study measures.

## Measures

### Grief facilitation inventory (GFI)

The GFI is a 24-item measure designed to evaluate the frequency of caregiver grief facilitation behaviors during the past month (Alvis et al., 2022; Kaplow & Layne, 2012). Youth provided observational reports of the items on a 5-point frequency scale ranging from 0 (*not at all*) to 4 (*all the time*). The GFI consists of four subscales: Ongoing Connection (7 items;  $\omega = .92$ ; e.g., “My caregiver does things with me to help me remember my \_”), Existential Continuity and Support (8 items;  $\omega = .79$ ; e.g., “...lets me know that I can still have a good life even though my \_ has died”), Caregiver Grief Expression (4 items;  $\omega = .85$ ; e.g., “...tells me how he/she is feeling about my \_'s death”), and Grief Inhibition/Avoidance (5 items;  $\omega = .58$ ; e.g., “...tells me not to talk about how my \_ died with people outside of my family”). The GFI has exhibited acceptable reliability, criterion referenced validity, and clinical utility in a diverse sample of bereaved youth (Alvis et al., 2022).

### Data analysis

Analyses were run in RStudio Version 4.1. GFI item missingness ranged from 0% to 2.0%; 95% of cases had complete data, with no case missing over 6 items. A pairwise present approach was used to account for missing data. A mean- and

variance-adjusted weighted least squares estimator (WLSMV) was employed, with item indicators specified as categorical (Bowen & Masa, 2015). Acceptable model fit required root-mean-square error of approximation (RMSEA) < .08 and comparative fit index (CFI) and Tucker-Lewis index (TLI) > .90 (Little, 2013). Omega values assessed internal consistency in the total sample and subgroups. MI tests followed Brown's (2006) sequence: (a) confirmatory factor analyses (CFAs) were estimated to assess factor structure and model fit separately for each group; (b) upon acceptable baseline model fit, multigroup CFAs were conducted to evaluate the configural model in which loadings and thresholds are free to vary across groups; (c) the configural model was then compared with the metric model in which loadings are held equal; and (d) the metric model was compared with the scalar model, in which both loadings and indicator thresholds are held equal. MI was tested across gender (boys,  $n=228$ ; girls,  $n=327$ ), race/ethnicity (Latino(a)/Hispanic,  $n=229$ ; White,  $n=131$ ; Black,  $n=79$ ; Multiracial,  $n=86$ ), and age group (late childhood [7–10 years],  $n=136$ ; preadolescent [11–13 years],  $n=191$ ; adolescent [14–18 years],  $n=231$ ). Due to the large size of the sample and the sensitivity of the chi-square difference test to sample-size (Meade et al., 2008; Milfont & Fischer, 2010),  $\Delta CFI > .010$  in the more restrictive model was used to indicate MI (Cheung & Rensvold, 2002). Latent group means were examined within scalar invariance models by fixing the reference group mean to zero and testing group mean differences.

## Results

The internal consistencies for each factor and each subgroup are provided in the [Supplementary Materials](#). Internal consistency reliability for GFI factor scores across subgroups were good for ongoing connection ( $\omega=.88-.96$ ), existential continuity and support ( $\omega=.78-.83$ ), and caregiver grief expression ( $\omega=.75-.91$ ). Internal consistency for grief inhibition/avoidance scores were acceptable for Multiracial ( $\omega=.75$ ) and White youth ( $\omega=.76$ ) but were below .70 in the remaining subgroups ( $\omega=.34-.65$ ).

Prior to evaluating MI, separate CFAs were performed to ensure adequate model fit for each subsample. Fit statistics and factor loadings are reported in the [Supplementary Materials](#). All models showed good fit (CFIs=.946–.962, TLIs=.939–.958, RMSEAs=.051–.075). However, all five factor loadings for grief inhibition/avoidance were nonsignificant for Black and Latino(a)/Hispanic youth ( $Bs=0.00-6.55$ ,  $SEs=0.47-4.89$ ,  $ps=.180-.993$ ) and one factor loading for grief inhibition/avoidance (GFI\_26) was nonsignificant for late childhood youth ( $B=0.46$ ,  $SE=0.29$ ,  $p=.109$ ). Due to the low internal consistency of grief inhibition/avoidance in most subgroups and nonsignificant factor loadings, this factor was removed from the CFA for subsequent analyses.

CFAs using the new three-factor solution were run for each subgroup. Model fit statistics and the results of difference tests are provided in [Table 1](#) and standardized factor loadings are reported in [Table 2](#). All models showed good model fit, with fit indices similar for boys and girls; Latino(a)/Hispanic, White, Black, and Multiracial youth; and late childhood, preadolescent, and adolescent youth. All factor loadings were significant.

**Table 1.** Model fit statistics of the single-group confirmatory factor analysis and configural, metric, and scalar invariance models using the three-factor solution.

| Model                                    | $\chi^2$ | df  | p      | RMSEA | Lower RMSEA | Upper RMSEA | TLI   | CFI   | $\Delta CFI$ |
|--|----------|-----|--------|-------|-------------|-------------|-------|-------|--------------|
| Full Sample                              | 540.12   | 149 | <0.001 | 0.070 | 0.064       | 0.076       | 0.962 | 0.967 |              |
| Boys                                     | 399.63   | 149 | <0.001 | 0.073 | 0.064       | 0.082       | 0.962 | 0.967 |              |
| Girls                                    | 274.60   | 149 | <0.001 | 0.062 | 0.051       | 0.074       | 0.966 | 0.971 |              |
| Latino(a)/Hispanic                       | 181.13   | 149 | 0.038  | 0.053 | 0.014       | 0.079       | 0.975 | 0.978 |              |
| Black                                    | 349.44   | 149 | <0.001 | 0.078 | 0.068       | 0.089       | 0.962 | 0.967 |              |
| Multiracial                              | 206.23   | 149 | 0.001  | 0.069 | 0.044       | 0.091       | 0.969 | 0.973 |              |
| White                                    | 242.15   | 149 | <0.001 | 0.070 | 0.054       | 0.086       | 0.956 | 0.962 |              |
| Late childhood                           | 222.25   | 149 | <0.001 | 0.063 | 0.045       | 0.079       | 0.947 | 0.954 |              |
| Pre-adolescent                           | 239.31   | 149 | <0.001 | 0.057 | 0.044       | 0.071       | 0.978 | 0.981 |              |
| Adolescent                               | 402.69   | 149 | <0.001 | 0.087 | 0.077       | 0.097       | 0.959 | 0.964 |              |
| Measurement Invariance by Gender         |          |     |        |       |             |             |       |       |              |
| Configural                               | 651.25   | 298 | <0.001 | 0.067 | 0.060       | 0.074       | 0.966 | 0.970 |              |
| Metric                                   | 687.16   | 352 | <0.001 | 0.060 | 0.053       | 0.066       | 0.973 | 0.972 | .002         |
| Scalar                                   | 648.33   | 368 | <0.001 | 0.054 | 0.047       | 0.060       | 0.978 | 0.976 | .004         |
| Measurement Invariance by Race/Ethnicity |          |     |        |       |             |             |       |       |              |
| Configural                               | 925.96   | 596 | <0.001 | 0.066 | 0.058       | 0.075       | 0.969 | 0.973 |              |
| Metric                                   | 1071.08  | 758 | <0.001 | 0.057 | 0.049       | 0.065       | 0.977 | 0.974 | .001         |
| Scalar                                   | 1085.79  | 806 | <0.001 | 0.053 | 0.044       | 0.060       | 0.980 | 0.977 | .003         |
| Measurement Invariance by Age            |          |     |        |       |             |             |       |       |              |
| Configural                               | 852.19   | 447 | <0.001 | 0.071 | 0.064       | 0.079       | 0.965 | 0.970 |              |
| Metric                                   | 1055.44  | 555 | <0.001 | 0.071 | 0.065       | 0.078       | 0.966 | 0.963 | .007         |
| Scalar                                   | 1096.38  | 587 | <0.001 | 0.070 | 0.063       | 0.076       | 0.967 | 0.962 | .001         |

**Table 2.** Standardized factor loadings and omegas (italicized) for three-factor GFI among full sample and subgroups.

| Item  | Full Sample | Boys        | Girls       | Latino(a)/Hispanic | Black       | Multiracial | White       | Late Childhood | Pre-adolescent | Adolescent  |
|---|-------------|-------------|-------------|--------------------|-------------|-------------|-------------|----------------|----------------|-------------|
| <i>Ongoing Connection</i>                   | <i>0.93</i> | <i>0.92</i> | <i>0.95</i> | <i>0.90</i>        | <i>0.96</i> | <i>0.92</i> | <i>0.88</i> | <i>0.93</i>    | <i>0.95</i>    | <i>0.93</i> |
| GFI_10                                      | 0.89        | 0.88        | 0.90        | 0.93               | 0.92        | 0.89        | 0.86        | 0.82           | 0.92           | 0.92        |
| GFI_11                                      | 0.90        | 0.89        | 0.91        | 0.92               | 0.91        | 0.94        | 0.90        | 0.82           | 0.92           | 0.93        |
| GFI_13                                      | 0.81        | 0.83        | 0.78        | 0.73               | 0.85        | 0.82        | 0.80        | 0.82           | 0.80           | 0.83        |
| GFI_34                                      | 0.76        | 0.76        | 0.74        | 0.71               | 0.79        | 0.87        | 0.80        | 0.66           | 0.79           | 0.80        |
| GFI_4                                       | 0.76        | 0.79        | 0.74        | 0.68               | 0.78        | 0.77        | 0.81        | 0.69           | 0.79           | 0.82        |
| GFI_21                                      | 0.79        | 0.83        | 0.74        | 0.69               | 0.85        | 0.82        | 0.83        | 0.71           | 0.80           | 0.85        |
| GFI_12                                      | 0.71        | 0.70        | 0.75        | 0.70               | 0.71        | 0.67        | 0.70        | 0.64           | 0.72           | 0.73        |
| <i>Existential Continuity &amp; Support</i> | <i>0.80</i> | <i>0.79</i> | <i>0.79</i> | <i>0.83</i>        | <i>0.80</i> | <i>0.78</i> | <i>0.78</i> | <i>0.79</i>    | <i>0.79</i>    | <i>0.80</i> |
| GFI_27                                      | 0.70        | 0.72        | 0.67        | 0.73               | 0.70        | 0.71        | 0.70        | 0.74           | 0.75           | 0.66        |
| GFI_16                                      | 0.71        | 0.71        | 0.71        | 0.87               | 0.71        | 0.73        | 0.65        | 0.69           | 0.64           | 0.78        |
| GFI_29                                      | 0.67        | 0.71        | 0.64        | 0.72               | 0.66        | 0.62        | 0.69        | 0.60           | 0.71           | 0.68        |
| GFI_36                                      | 0.75        | 0.75        | 0.75        | 0.78               | 0.79        | 0.82        | 0.69        | 0.66           | 0.80           | 0.73        |
| GFI_17                                      | 0.70        | 0.72        | 0.65        | 0.59               | 0.74        | 0.74        | 0.77        | 0.65           | 0.68           | 0.73        |
| GFI_22                                      | 0.27        | 0.20        | 0.39        | 0.46               | 0.23        | 0.21        | 0.16        | 0.58           | 0.21           | 0.14        |
| GFI_30                                      | 0.47        | 0.49        | 0.45        | 0.58               | 0.47        | 0.52        | 0.52        | 0.25           | 0.49           | 0.61        |
| GFI_31                                      | 0.64        | 0.70        | 0.54        | 0.39               | 0.71        | 0.70        | 0.65        | 0.47           | 0.59           | 0.75        |
| <i>Caregiver Grief Expression</i>           | <i>0.88</i> | <i>0.85</i> | <i>0.86</i> | <i>0.80</i>        | <i>0.89</i> | <i>0.89</i> | <i>0.75</i> | <i>0.87</i>    | <i>0.91</i>    | <i>0.88</i> |
| GFI_3                                       | 0.88        | 0.89        | 0.86        | 0.81               | 0.88        | 0.96        | 0.91        | 0.80           | 0.85           | 0.93        |
| GFI_2                                       | 0.88        | 0.87        | 0.88        | 0.75               | 0.89        | 0.90        | 0.89        | 0.85           | 0.85           | 0.91        |
| GFI_6                                       | 0.65        | 0.69        | 0.60        | 0.58               | 0.64        | 0.71        | 0.72        | 0.44           | 0.60           | 0.78        |
| GFI_1                                       | 0.84        | 0.86        | 0.81        | 0.83               | 0.87        | 0.78        | 0.84        | 0.72           | 0.87           | 0.88        |

Configural invariance models demonstrated acceptable CFI values, ranging from .954 to .981, and TLI values, ranging from .947 to .978; and low RMSEA values, ranging from .053 to .087. This indicated that configural invariance models fit the data adequately across subgroups. Concerning metric invariance models, fit indices showed acceptable fit with this constraint as indicated by a change in CFI value less than .010 (range: < .001–.007). Thus, individual item factor loadings demonstrated invariance across gender, race/ethnicity, and age. Regarding scalar invariance, fit indices showed acceptable fit with this constraint, as indicated by a change in CFI of less than .010, as compared to the metric invariance models, for which the range was < .001 to .004. Thus, the item thresholds demonstrated invariance, and the three-factor solution of the GFI met the criteria for scalar invariance with respect to gender, race/ethnicity, and age groups.

Comparisons of latent group means were evaluated, accounting for sources of measurement error at the item level. No significant mean differences were found across gender. Black youth reported significantly higher ongoing connection scores compared to Latino(a)/Hispanic ( $M_{diff} = .29, p = .042$ ) and White youth ( $M_{diff} = .33, p = .032$ ), and higher caregiver grief expression compared to White ( $M_{diff} = .37, p = .028$ ) and Multiracial youth ( $M_{diff} = .35, p = .033$ ). Pre-adolescent youth reported significantly higher existential continuity and support relative to late childhood youth ( $M_{diff} = .28, p = .021$ ).

## Discussion

This was the first study to examine the cross-group psychometric properties of the GFI. Specifically, we examined measurement invariance of GFI subscales with regard to gender (boys, girls), race/ethnicity (Latino(a)/Hispanic, White, Black, Multiracial), and age (late childhood, preadolescent, adolescent) in a sample of treatment-seeking bereaved youth. Multigroup CFAs did not provide support for the original four-factor structure of the GFI due to low reliability of the grief inhibition/avoidance factor in certain demographics. After removing this factor from the model, results supported MI of the three remaining GFI subscales across each group. Configural invariance indicated that the three-factor structure of the GFI was similar for all groups. Metric invariance indicated that factor loadings were similar in magnitude and scalar invariance indicated that item thresholds were equivalent across groups.

Although model fit statistics were acceptable across demographic groups for the original four-factor GFI, all five factor loadings for grief inhibition/avoidance were nonsignificant for Black and Latino(a)/Hispanic youth and one loading for this factor was nonsignificant for late childhood youth, suggesting these GFI items may not be equally meaningful for all youth. This pattern of findings is consistent with the low internal consistencies for grief inhibition/avoidance scores across nearly all subgroups and indicate that

Black, Latino(a)/Hispanic, and younger youth respond to these items in a manner that is more independent (i.e., less related to one another) relative to non-Black, non-Latino(a)/Hispanic, and older youth, respectively. Grief inhibition/avoidance items may not be universally applicable across diverse populations of youth, which may be due, in part, to potential cultural differences in mourning rituals and communication about death (Alvis et al., 2022). For instance, whereas some Latino cultures prioritize emotional expressiveness in grief, other cultural norms may stress stoicism. Youth from cultures that encourage emotional expression may find grief inhibition/avoidance items less relevant or meaningful, thus contributing to nonsignificant factor loadings. In addition, youth of color report disproportionately high levels of community violence exposure including homicide (Douglas et al., 2021), and recent studies suggest avoidance can be an adaptive coping strategy for youth of color living in high crime communities where overt expressions of grief may increase vulnerability to victimization and hinder their ability to navigate dangerous neighborhoods (Gaylord-Harden et al., 2011). Caregiver grief inhibition/avoidance within Black and Latino(a) families may therefore not only manifest in different types of behaviors not currently captured by the GFI, but also have different implications for adjustment. Moreover, wording for the nonsignificant grief inhibition/avoidance item among late childhood youth, “My caregiver lets me know that he/she isn’t really the best person to talk to about my \_’s death”, may have been difficult for younger youth to interpret. Research has indicated that children may face difficulties with negatively phrased items, especially on positive ascending scales (Van Dijk et al., 2023). Together, findings suggest that the conceptualization of grief inhibition/avoidance should be further investigated to refine measurement of this construct and better understand perceptions of caregivers’ efforts to inhibit grief reactions in diverse populations.

Findings showed group differences in GFI latent mean scores by race/ethnicity and age. Black youth reported higher ongoing connection compared to both Latino(a)/Hispanic and White youth, and higher caregiver grief expression compared to both White and Multiracial youth. Black youth are more likely than White youth to experience the death of a loved one by homicide and this increased risk for violent loss exposure is related to higher maladaptive grief reactions among Black youth (Douglas et al., 2021). It is possible that Black youth experiencing distress may elicit more grief facilitating behaviors from their caregivers to cope. In addition, factors such as religion

and spirituality can influence how Black families approach grief with their children (Brooten et al., 2016). Regarding age differences, pre-adolescent youth reported higher existential continuity and support when compared to late childhood youth. Between late childhood and early adolescence, the use of adaptive emotion regulation strategies tends to decrease while the use of maladaptive strategies increase (Cracco et al., 2017). Given preadolescents’ developing capacity for abstract reasoning and limited emotion regulation abilities, they may require more existential support and reassurance. Future research should explore potential mechanisms underlying race- and age-related GFI differences.

Study results should be considered in light of certain limitations. Despite a large and racially/ethnically diverse sample, certain ethnic groups (e.g., American Indian/Alaskan Native, Asian, Pacific Islander) were underrepresented. Future research should explore if findings extend to these groups. Similarly, although MI was demonstrated for English-speaking participants, future research is needed to examine MI across English- and Spanish-language GFI versions. The present study involved support-seeking bereaved youth; further research is needed to assess GFI psychometric properties in general bereaved youth samples.

Findings from this study have important implications for clinical practice and research with bereaved youth. Examining measurement equivalence across subpopulations is a necessary step to evaluating the use of a given measure in applied and research contexts. Results indicate that three domains of grief facilitation measured by the GFI (ongoing connection, existential continuity and support, and caregiver grief expression) demonstrate MI across gender, race/ethnicity, and age thus supporting the appropriateness of this measure to capture grief facilitation in both research and applied settings within these subpopulations. The grief inhibition/avoidance subscale should be used with caution and interpreted in the context of low reliability for Black, Latino(a), and younger youth.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

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## ORCID

Lauren Alvis  <http://orcid.org/0000-0002-6075-9110>

## Data availability statement

The preexisting dataset analyzed for this study is not publicly available, but is available upon reasonable request from the Trauma and Grief (TAG) Center team ([lalvis@mmhpi.org](mailto:lalvis@mmhpi.org)), who are the owners of these data.

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