Examining Minority Attrition Among Women in Longitudinal Trauma Research

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Research suggests that racial and ethnic minorities are more likely to attrit from longitudinal trauma studies than non-Hispanic Whites. Yet, little is known about how the loss of minority participants influences longitudinal findings as well as internal and external validity of study findings. Thus, the present study examined the effects of race/ethnicity on attrition in a longitudinal trauma study of women (minority = 223, non-Hispanic White or majority = 459) exposed to a campus shooting. Survival analyses were used to compare the attrition rates of minority participants to majority participants and assess the extent to which race/ethnicity, among other variables, predicted attrition. Minority participants were more likely to attrit than majority participants, hazard ratio ($HR = 0.69, 95\% \text{ CI } [0.48, 0.99]$, even after adjusting for study variables. A main effect was also found for age, $HR = 1.06, 95\% \text{ CI } [1.01, 1.12]$. Race/ethnicity did not interact with other study variables to influence attrition. The findings underscored the importance of assessing the effects of attrition on longitudinal findings and external validity.

There is increasing recognition that longitudinal designs are important for understanding the impact of trauma as well as the need to understand the effects of attrition on these long-term outcomes (Scott, Sonis, Creamer, & Dennis, 2006). Commonly, attrition results from premature withdrawal, refusal to participate, failed contact, illness, or injury, and incompatibility with the research team (Scott et al., 2006). Attrition poses a threat to internal and external validity and likely varies as a function of research design. For example, treatment outcome studies may be financially and emotionally taxing on participants in ways that survey-based studies are not. Attrition becomes particularly concerning when members of underrepresented populations, such as racial/ethnic minorities, are differentially lost. It is often difficult to recruit racially and ethnically diverse samples, underscoring the importance of evaluating the effects of attrition on longitudinal research.

It is difficult to gauge the extent of racial/ethnic differences in attrition within trauma research due to inconsistencies in reporting this information (Goodman & Blum, 1996; Matthieu & Ivanoff, 2006). Of the relatively few studies that report attrition analyses, findings have been mixed. Some longitudinal trauma studies have found racial/ethnic group differences in attrition (Cukor et al., 2011; Sharkansky et al., 2000; Updegraff, Silver, & Holman, 2008), whereas others have not (Benotsch et al., 2000; Ginzburg, 2004). Lester, Artz, Resick, and Young-Xu (2010) found a significant relationship between race/ethnicity and attrition in a sample of female interpersonal violence survivors receiving treatment for posttraumatic stress disorder (PTSD). Yet, other treatment outcome studies have reported negligible differences (Foa et al., 2005; Galovskij, Blain, Mott, Elwood, & Houle, 2012; Garcia, Kelley, Rentz, & Lee, 2011; van Minnen, Arntz, & Keijsers, 2002; Zayfert, Deviva, Becker, Pike, & Gillick, 2005). The racial/ethnic differences found in these studies were that minority participants were more likely to dropout compared to White participants. Regrettably, many studies did not assess the effect of differential attrition rates by racial/ethnic groups on study data. Therefore, it is unclear how increasing levels of minority attrition might affect longitudinal findings.

When minority participants are lost from a study, the results could become biased toward majority participants with slightly better posttrauma functioning. Evidence is mixed as to whether racial/ethnic minorities endure more stressful life events that are associated with adverse outcomes (e.g., poverty; Turner & Lloyd, 2004). For example, research has shown that Blacks had an increased conditional risk for developing PTSD symptoms and a lower risk for depressive symptoms than Whites, even after adjusting for confounding variables (Adams & Boscarino, 2005; Ghafouri, Barragan, Tohidian, & Palinkas, 2012; Hirth, & Berenson, 2012; Roberts, Gilman, Breslau, Breslau, & Koenen, 2006). Of the relatively few studies that report attrition analyses, findings have been mixed. Some longitudinal trauma studies have found racial/ethnic group differences in attrition (Cukor et al., 2011; Sharkansky et al., 2000; Updegraff, Silver, & Holman, 2008), whereas others have not (Benotsch et al., 2000; Ginzburg, 2004). Lester, Artz, Resick, and Young-Xu (2010) found a significant relationship between race/ethnicity and attrition in a sample of female interpersonal violence survivors receiving treatment for posttraumatic stress disorder (PTSD). Yet, other treatment outcome studies have reported negligible differences (Foa et al., 2005; Galovskij, Blain, Mott, Elwood, & Houle, 2012; Garcia, Kelley, Rentz, & Lee, 2011; van Minnen, Arntz, & Keijsers, 2002; Zayfert, Deviva, Becker, Pike, & Gillick, 2005). The racial/ethnic differences found in these studies were that minority participants were more likely to dropout compared to White participants. Regrettably, many studies did not assess the effect of differential attrition rates by racial/ethnic groups on study data. Therefore, it is unclear how increasing levels of minority attrition might affect longitudinal findings.

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Among veterans, Mexican Americans and Puerto Ricans endorsed significantly higher levels of PTSD symptoms than Whites, an effect that remained significant after accounting for potential covariates (Ortega & Rosenheck, 2000). By contrast, other studies have reported minimal racial/ethnic differences in symptoms of PTSD, depression, or anxiety among racially and ethnically diverse veterans (Monnier, Elhai, Frueh, Sauvageot, & Magruder, 2002; Ortega & Rosenheck, 2000), urban community members (Ghafoori et al., 2012), and survivors of the September 11, 2001 attacks (Galea et al., 2002, 2003).

In light of this conflicting evidence, the purpose of the present study was to assess the effects of race/ethnicity on attrition. We predicted that minority participants would attrit at a significantly higher rate than majority participants. A secondary goal was to assess the extent to which race/ethnicity interacted with other study variables (e.g., age, education, trauma exposure, physical health, mental health) to affect attrition. For example, minority participants with elevated symptomatology may be more likely to drop out than majority participants or participants with less symptomatology. Little is known about the influence of reactions to research participation on attrition. Thus, reactions to research participation were examined as a way of understanding how the personal experiences of minority attritors might differ from that of other participants. To distinguish participants who dropped out at earlier time points from those who dropped out at later time points, baseline data were used in present analyses.

**Method**

**Participants and Procedure**

Data were obtained from a subsample of 691 female undergraduate students who were enrolled in a longitudinal study of sexual revictimization at the time of a mass campus shooting at Northern Illinois University (NIU; DeKalb, IL, USA) on February 14, 2008. Consequently, the original study aims were modified to include investigating reactions to this fateful event. All potential participants were recruited from an introductory psychology course subject pool and were required to be female, at least 18 years old, and fluent in English. Initial inclusion was not based on a history of sexual victimization.

The preshooting assessment (T1) data was collected between August 2006 and February 2008. Of the initial 1,045 participants, 885 consented to future contact. Approximately 1 month following the shooting, participants who were current NIU students (n = 812 of 885) were invited to the first postshooting assessment (T2), which 691 participants completed. (Participants who did not complete T2 were ineligible for future time points due to our focus on longitudinally assessing responses to the mass shooting.) Subsequent longitudinal data were collected in 6-month intervals postshooting: 6 months (T3; n = 633), 12 months (T4; n = 617), 18 months (T5; n = 598), 24 months (T6; n = 558), and 30 months (T7; n = 557). Participants were excluded as extreme outliers on age (n = 4) and for not reporting their race or ethnicity (n = 5).

The final sample consisted of 682 participants. The average age at T1 was 18.96 (SD = 2.53) years. The majority of participants (69.8%) self-identified as White, 20.4% as Black, 3.1% as Asian, and 6.7% as other/multiracial. Seven percent of the sample self-identified as Hispanic/Latina. Approximately 73.5% of participants were freshmen, 17.8% were sophomores, 7.0% were juniors, and 1.6% were seniors at the outset of this study (0.3% preferred not to respond). By T7, 67.2% of active participants were undergraduate students, 20.6% had graduated, 6.7% had withdrawn from the university, and 3.0% were attending graduate school (2.5% preferred not to respond). Of the attritors (n = 129 of 686; 18.8%), 87.6% were undergraduate students followed by 3.1% who had graduated, 6.2% who had withdrawn from the university, and 2.3% that were attending graduate school (0.8% preferred not to respond). The majority of participants (82.5%) reported exposure to at least one qualifying Criterion A trauma at T1(American Psychiatric Association, 2000). For the remaining 17.5%, the shooting may have been their first exposure to a potentially traumatic event.

At T1, participants were invited to a 90-min individual session where they were administered a computerized survey. The remaining surveys (T2–T7) were administered online and took approximately 30–40 min. Informed consent was obtained at the outset of each survey administration. All participants received partial course credit for their participation at T1 and were given the option of $40 compensation at subsequent time points. Any participants who were enrolled in Introductory Psychology at T2 were given the option of receiving course credit or $40, for which few selected course credit (n = 34). To ensure confidentiality, participants were assigned a unique identification code that linked their identifying information with their survey data. Identifying information was kept separately from survey data, all of which were stored in password-protected, encrypted electronic files. This study was approved by the NIU Institutional Review Board.

**Measures**

Demographic characteristics, such as age (in years), race, ethnicity, and education were obtained at T1. Race and ethnicity were condensed into a single dummy-coded variable: White and non-Hispanic (i.e., majority participants) and other (i.e., minority participants). T1 education was coded from 1 for freshmen to 4 for seniors.

At T1, the Traumatic Life Events Questionnaire (TLEQ; Kubany, Haynes, et al., 2000) assessed lifetime exposure to 22 potentially traumatic events. A count variable was computed by adding the total number of traumatic events ever experienced (range = 0 to 22). The TLEQ has demonstrated good test-retest reliability and convergent validity (Kubany, Haynes, et al., 2000).

At T2, participants completed a 12-item questionnaire, adapted from the Virginia Tech Shooting Exposure Measure (Littleton, Axsom, & Grills-Taquechel, 2009), which assessed level of exposure to the mass shooting. Participants indicated
their experiences with different aspects of the shooting (e.g., on campus, heard gunfire, saw individual who had been wounded or killed). Items were summed to compute a count score with higher values indicating greater shooting exposure severity.

The General Health subscale of the RAND-36 Health Status Inventory (RAND-36; Hays, Sherbourne, & Mazel, 1993) assessed overall current physical health at T1. Items were transformed to percentage scores so that ratings ranged from 0 to 100. Then items were averaged to compute a mean score (Hays, Prince-Embry, & Chen, 1998). Higher scores reflected better overall health. Despite low discriminant validity, the RAND-36 has demonstrated high internal consistency and good convergent validity (VanderZee, Sanderman, Heyink, & de Haes, 1996). The General Health subscale has shown adequate internal consistency in a chronically ill sample (Moorer, Suumeije, Foets, & Molenaar, 2001) and in this study (α = .78).

The Distressing Events Questionnaire (DEQ; Kubany, Leisen, Kaplan, & Kelly, 2000) assessed PTSD severity at T1. Participants rated (1 = almost never to 5 = almost always) the degree to which they experienced PTSD symptoms in the last 30 days. PTSD symptoms were assessed in relation to an index trauma nominated from the TLEQ. Mean DEQ scores were computed by averaging items. The DEQ has demonstrated strong internal consistency, test-retest reliability, and convergent and discriminant validity (Kubany, Leisen, et al., 2000). In this study, the DEQ showed excellent internal consistency (α = .92).

The Depression Anxiety Stress Scale (DASS-21) subscales (Lovibond S. H. & Lovibond, 1995) were administered at T1. Participants indicated (0 = Did not apply to me at all to 3 = Applied to me very much or most of the time) the degree to which symptoms of dysphoric mood (e.g., sadness, worthlessness) and anxiety due to elevated physiological arousal (e.g., trembling, faintness) were present in the last week. Mean Depression and Anxiety scores were computed by averaging the subscale items. The DASS-21 and its subscales have demonstrated adequate internal consistency in addition to adequate convergent and discriminant validity (Antony, Bieling, Cox, Enns, & Swinson, 1998; Gloster et al., 2008; Lovibond, P. F. & Lovibond, 1995). In this study, the internal consistencies for the Depression (α = .83) and Anxiety subscales (α = .77) were acceptable.

Two items from the Reactions to Research Participation Questionnaire-Revised (RRPQ-R; Newman, Willard, Sinclair, & Kaloupek, 2001) were utilized at T1 to assess perceived benefits (“I gained something positive from participating”) and perceived costs (“Participating in this study was inconvenient for me”) of participating. These items were rated on a Likert scale (1 = strongly disagree/no to 5 = strongly agree/yes) with higher ratings indicating more perceived benefits and more perceived costs.

Data Analysis
The data were analyzed in SPSS 21.0 using survival analysis, a family of statistical techniques that provides information related to the time it takes for an event to occur. The event of interest in this study was time to dropout (coded as 1). Dropout was characterized as the last time point (prior to T7) for which data were available for any given participant. Because time was measured in intervals, discrete-time modeling was utilized. In survival analysis, survival functions (i.e., distribution of cases that survive until an event occurs) are created and analyzed for one or more groups. The Kaplan-Meier method compared the survival functions of minority participants to majority participants to estimate the cumulative proportion of participants by race/ethnicity that survived until the next time point (see Figure 1).

The relationship between race/ethnicity and other variables that might influence attrition were assessed using a hierarchical Cox regression model (Tabachnic & Fidell, 2007). To distinguish earlier attriters from late attriters on study measures, baseline data were used to predict attrition. In the first step, covariates were entered individually, followed by interaction terms added to assess whether race/ethnicity interacted with other covariates to affect attrition in the second step. Coefficients indicated the magnitude of the effect of covariates on the hazard of attrition. The exponentiation of these coefficients represents the hazard ratio (or relative risk) of dropping out (as opposed to remaining an active participant) in this study. The primary assumption of Cox regression is that the rate of survival for covariates is constant across time (proportionality of hazards assumption). This assumption was tested by computing a Cox regression model in which interactions between time-invariant covariates (i.e., trauma history, race, shooting exposure) and the natural logarithm of time were regressed on attrition (Tabachnick & Fidell, 2007). None of these interactions were significant indicating that the assumption was met.

Results
Independent t tests confirmed that data were not missing at random on education (0.3%), PTSD (6.9%), and perceived benefits (0.9%). Data were missing at random on general health (0.4%) and perceived costs (0.9%). Because there was only a small proportion of data not missing at random, missing values were replaced using variable mean substitution (Tabachnick & Fidell, 2007). Multicollinearity was assessed for interaction terms to assess for potential overlapping variance. Study variables did not appear to have high collinearity, according to high tolerance values (above .10) and low variance inflation factor (VIF) values (below 10; Cohen, Cohen, West, & Aiken, 2003). Table 1 shows the correlations and descriptive statistics for study variables.

As seen in Figure 1, Kaplan-Meier analysis showed that the rate of survival for minority participants was lower than that of majority participants, indicating that minority women attrited more often than majority women. By T7, 82.8% of majority participants were active compared to 75.3% of minority participants. As expected, this difference in attrition was statistically

significant according to a log-rank test, $\chi^2(1, N = 682) = 4.69, p = .030$, Cohen’s $w = .08$.

Covariates reliably predicted attrition in the initial step of the hierarchical Cox regression model, $\chi^2(11, N = 682) = 23.53, p = .015, w = .19$. Results are shown in Table 2. As expected, there was a main effect of race/ethnicity, hazard ratio ($HR = 0.69$, 95% confidence interval (CI) [0.48, 0.99]). This provides further evidence that minority participants were more likely to dropout than majority participants, even after adjusting for other covariates. A significant main effect was also found for age, $HR = 1.06$, 95% CI [1.01, 1.12], suggesting that participants who were younger at T1 were more likely to drop out. Adding the interaction terms did not improve the ability of the model to predict attrition, $\Delta \chi^2(10, N = 682) = 14.66, \Delta p = .145, w = .15$. This indicated that racial/ethnic differences on other study variables did not influence attrition.

### Table 1

**Means, Standard Deviations, Ranges, and Correlations of Study Variables at T1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>Min</th>
<th>Max</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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<tbody>
<tr>
<td>1. Age</td>
<td>18.80</td>
<td>1.52</td>
<td>18</td>
<td>31</td>
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<td>–</td>
<td>–</td>
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<tr>
<td>2. Education</td>
<td>4.16</td>
<td>1.26</td>
<td>1</td>
<td>4</td>
<td>–.02</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>3. Race/ethnicity</td>
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<td>0.47</td>
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<td>1</td>
<td>.02</td>
<td>.10</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
</tr>
<tr>
<td>4. TLEQ</td>
<td>2.94</td>
<td>2.62</td>
<td>0</td>
<td>20</td>
<td>.01</td>
<td>.02</td>
<td>–.11</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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<tr>
<td>5. Shooting exposure</td>
<td>2.85</td>
<td>1.71</td>
<td>0</td>
<td>12</td>
<td>–.05</td>
<td>–.03</td>
<td>.03</td>
<td>.08</td>
<td>–</td>
<td>–</td>
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<td>–</td>
<td>–</td>
<td>–</td>
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<td>6. RAND-36</td>
<td>69.52</td>
<td>18.59</td>
<td>15</td>
<td>100</td>
<td>.02</td>
<td>.07</td>
<td>.02</td>
<td>–.22</td>
<td>–.01</td>
<td>–</td>
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<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>7. DASS-D</td>
<td>1.39</td>
<td>0.54</td>
<td>1.00</td>
<td>3.86</td>
<td>.04</td>
<td>–.09</td>
<td>–.03</td>
<td>.16</td>
<td>.11</td>
<td>–.30</td>
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<td>–</td>
<td>–</td>
<td>–</td>
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<td>8. DASS-A</td>
<td>1.26</td>
<td>0.44</td>
<td>1.00</td>
<td>3.43</td>
<td>–.01</td>
<td>–.07</td>
<td>–.04</td>
<td>.21</td>
<td>.11</td>
<td>–.33</td>
<td>.69</td>
<td>–</td>
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<tr>
<td>9. DEQ</td>
<td>.42</td>
<td>0.63</td>
<td>0</td>
<td>4</td>
<td>–.01</td>
<td>–.07</td>
<td>–.01</td>
<td>.24</td>
<td>.12</td>
<td>–.23</td>
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<tr>
<td>10. RRPQ benefits</td>
<td>3.60</td>
<td>0.94</td>
<td>1</td>
<td>5</td>
<td>.09</td>
<td>.13</td>
<td>–.05</td>
<td>.03</td>
<td>.01</td>
<td>.14</td>
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<td>–.01</td>
<td>–.03</td>
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<td>–</td>
</tr>
<tr>
<td>11. RRPQ drawbacks</td>
<td>4.41</td>
<td>0.92</td>
<td>1</td>
<td>5</td>
<td>.09</td>
<td>.08</td>
<td>.13</td>
<td>–.03</td>
<td>–.02</td>
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<td>–.17</td>
<td>–.22</td>
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<td>.11</td>
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<tr>
<td>12. Completion status</td>
<td>.19</td>
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<td>1</td>
<td>.01</td>
<td>–.43</td>
<td>–.08</td>
<td>.07</td>
<td>.01</td>
<td>–.16</td>
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<td>.18</td>
<td>.23</td>
<td>.17</td>
<td>–.17</td>
<td>–.13</td>
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</table>

*Note. N = 682. T1 = preshooting assessment completed between August 2006 and February 2008; TLEQ = Traumatic Life Events Questionnaire; Shooting exposure = adaptation of Virginia Tech Shooting Measure; RAND-36 = RAND-36 Health Status Inventory; DASS-D = Depression Anxiety Stress Scale-21 Depression subscale; DASS-A = Depression Anxiety Stress Scale-21 Anxiety subscale; DEQ = Distressing Events Questionnaire; RRPQ = Reactions to Research Participation Questionnaire-Revised. Bivariate correlations in bold are statistically significant ($p < .05$). *(N = 680. *Completion status refers to the last time point for which data were available for any given participant.*

Minority Attrition and Longitudinal Research

Table 2
Hierarchical Cox Regression Results Predicting Attrition at Any Time Point

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.06</td>
<td>0.03</td>
<td>1.06</td>
<td>[1.01, 1.12]</td>
</tr>
<tr>
<td>Education</td>
<td>0.12</td>
<td>0.13</td>
<td>1.12</td>
<td>[0.88, 1.44]</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>-0.37*</td>
<td>0.18</td>
<td>0.69</td>
<td>[0.48, 0.99]</td>
</tr>
<tr>
<td>TLEQ</td>
<td>0.02</td>
<td>0.04</td>
<td>1.02</td>
<td>[0.94, 1.09]</td>
</tr>
<tr>
<td>RAND-36 Health</td>
<td>0.02</td>
<td>0.06</td>
<td>1.02</td>
<td>[0.91, 1.15]</td>
</tr>
<tr>
<td>RAND-36 Depression</td>
<td>0.00</td>
<td>0.23</td>
<td>1.00</td>
<td>[0.64, 1.56]</td>
</tr>
<tr>
<td>DSQ-Angiety</td>
<td>0.06</td>
<td>0.24</td>
<td>1.06</td>
<td>[0.67, 1.70]</td>
</tr>
<tr>
<td>DEQ PTSD symptoms</td>
<td>0.13</td>
<td>0.16</td>
<td>1.13</td>
<td>[0.83, 1.54]</td>
</tr>
<tr>
<td>RRPQ-R benefits</td>
<td>-0.01</td>
<td>0.11</td>
<td>0.99</td>
<td>[0.81, 1.22]</td>
</tr>
<tr>
<td>RRPQ-R costs</td>
<td>0.07</td>
<td>0.10</td>
<td>1.08</td>
<td>[0.88, 1.32]</td>
</tr>
</tbody>
</table>

Note. N = 682. SE = standard error; HR = hazard ratio; CI = confidence interval; TLEQ = Traumatic Life Events Questionnaire; RAND-36 = RAND-36 Health Status Inventory; DSQ = Depression Anxiety Stress Scale-21; DEQ = Distressing Events Questionnaire; RRPQ-R = Reactions to Research Participation Questionnaire-Revised. Coefficients in bold are statistically significant (p < .05). aMissing values imputed with variable mean.

Discussion

Attrition is a substantial problem for longitudinal studies. It can occur for many reasons, ranging from refusal to participate to failed contact to death. Random attrition has little influence on study results whereas systematic attrition limits generalizability and can lead to faulty inferences (Goodman & Blum, 1996). Although it is strongly recommended that researchers assess the effects of attrition on their data, few studies report the extent to which attrition may have biased results (Goodman & Blum, 1996; Matthieu & Ivanoff, 2006). The present study focused on attrition as it related to race/ethnicity in a sample of women exposed to a campus shooting.

A comparison of the attrition of racial/ethnic groups yielded significant findings: Minority women were more likely to dropout than majority women. This finding supported other longitudinal trauma research that has found racial/ethnic disparities in attrition (Cukor et al., 2011; Lester et al., 2010; Sharkansky et al., 2000; Updegraff et al., 2008). It might be presumed that such racial/ethnic differences would bias study results. That assumption, however, is misleading. Goodman and Blum (1996) argued that examining the effect of attrition on demographic characteristics was insufficient for establishing evidence of systematic attrition. Instead, they suggested using techniques that estimate the probability of dropout (vs. study completion) based on demographic characteristics and study variables. When such analyses were conducted with the present data (i.e., Cox regression), race/ethnicity remained a significant predictor of attrition with other variables in the model. The loss of minority participants, however, did not interact with other study variables; therefore, it did not appear to bias longitudinal findings. Analyses also showed that age was associated with higher attrition, such that older participants were more likely to drop out than younger participants. Although further research is warranted, it was possible that older participants recruited within introductory psychology course pools may have felt less obligated to participate in this longitudinal study once they completed their degree, dropped out of the university, or transferred to another university. Based on these findings, external validity was restricted.

The present data provided little insight into why minority participants attritted at a significantly higher rate than majority participants. Even though there were many factors related to race/ethnicity that could have affected differences in attrition rates (e.g., symptom severity, trauma exposure, socioeconomic status, education; Adams & Boscarino, 2005; de Graaf, Bijl, Smit, Ravelli, & Vollebergh, 2000; Ghafoori et al., 2012; Hatch & Dohrenwend, 2007; Hirth & Berenson, 2012; Ortega & Rosenheck, 2000; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011; Young, Powers, & Bell, 2007), many of these factors (e.g., trauma exposure, symptom severity, education) were not related to racial/ethnic differences in attrition in this model. Cultural variables were not assessed in this study, but cross-cultural differences likely influenced willingness to participate and level of engagement in research. For example, clinical trials and medical studies have found that minority participants are more likely to attrit or refuse initial participation than White participants due to a mistrust of scientific investigators (McDougall, Holston, & Wilke, 2001; Shavers, Lynch, & Burmeister, 2002). Future research would benefit from investigating the role of cultural variables, such as trust of scientific researchers, on racial/ethnic differences in attrition in longitudinal trauma research. There are a number of strategies that may improve minority attrition, and broadly increase overall retention of participants in longitudinal trauma research, including intensive efforts to locate participants and use of community-based organizations and leaders to improve research compliance (Gillis et al., 2001; Scott et al., 2006).

This study was not without limitations. First, the sample consisted solely of female undergraduates. Attrition could differ between men and women (van Minnen et al., 2002), which may render the present findings inapplicable to men. Additionally, college samples may not represent the broader adult population. Second, minority participants were grouped together to simplify analyses, but attrition and its effects on data may have varied between racial/ethnic minority groups. Third, single items were used to measure perceived benefits and costs to research participation. Methodologists recommend that researchers exercise caution when using single items in place of multi-items (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012; Loo, 2002). Fourth, the findings of this survey-based study may have little generalizability to other research designs (e.g., interviews). Fifth, attrition in this study could have been influenced by a number of unmeasured variables...
(e.g., convenience sample; participants who dropped out, transferred, or graduated from the university; credibility of researchers; solidarity following exposure to the same fateful event) that may have confounded study results. It was emphasized in communications with present participants that for T3–T7, it was not necessary to be a current student to participate. Finally, tracking additional reasons for dropout other than active refusal could have provided important insight about attrition in relation to race/ethnicity in this study.

Despite these limitations, this study addressed an important issue: the effects of racial/ethnic disparities in attrition on longitudinal trauma research. These findings, albeit sample specific, demonstrated that race/ethnicity was significantly related to attrition. Additional studies on this topic, however, are warranted to better understand the relationship between attrition and race/ethnicity. There was also a loss of older participants in this study, which may not be unexpected in a college sample. It is recommended that future longitudinal studies thoroughly assess the effects of attrition on demographic characteristics and study data to understand the extent to which longitudinal findings may be biased and validity is compromised (Goodman & Blum, 1996). Future studies might also consider conducting qualitative follow-up studies with nonresponders, especially those from diverse racial/ethnic groups, to gain better insight into specific causes of attrition.

References


