



Prospective Study of Major Loss Life Events and Risk for Suicidal Thoughts and Behaviors Among Adolescents and Young Adults

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This prospective, naturalistic study examined the association between major loss life experiences, other psychiatric risk factors (depression, hopelessness, and anxiety), and suicidal thoughts and behaviors (STBs) among adolescents followed through young adulthood for up to 14 years. Major loss life events were related to subsequent increases in STBs. Major loss life events were primarily related to increases in suicide ideation in the presence of lower levels of other risk factors. There was a bidirectional relationship between major losses and other risk factors. Implications for the association between loss experiences, other risk factors, and future STBs are discussed.

To better understand and ultimately prevent suicidal behavior, considerable research has focused on identifying the distal and proximal risk factors for suicide-related thoughts and behaviors (STBs; Goldsmith, Pellmar, Kleinman, & Bunney, 2002). *Distal risk factors* are factors that increase vulnerability or the likelihood of STBs over time, whereas *proximal risk factors* occur near in time to STBs and can be conceptualized as triggers or more immediate precipitants (Moscicki, 1995). One of the most common proximal risk factors for suicide thoughts, attempts, and deaths is the experience of major loss such as death or a breakup in friendships or romantic relationships (Bagge, Glenn, & Lee, 2013; Beautrais, Joyce, & Mulder, 1997; Brent, Perper,

Moritz, Baugher, & Allman, 1993; Brent et al., 1988; Conner et al., 2012; Foster, 2011; Gould, Fisher, Parides, Flory, & Shaffer, 1996). The importance of loss experiences in the genesis of suicidal behavior is underscored by Joiner's (2005) interpersonal theory of suicide, in which "thwarted belongingness" or lack of connection to others is described as one of the most important risk factors for suicide.

Nonetheless, our understanding of the relationship between negative life events, and events that involve loss, in particular, and STBs is limited in several respects. First, the great majority of the literature is cross-sectional in design (Liu & Miller, 2014; Sandin, Chorot, Santed, Valiente, & Joiner, 1998). There have been

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relatively few prospective studies of the relationship between life stresses and other preexisting risk factors in increasing risk for STBs (Liu & Miller, 2014). To the degree that loss events do increase risk, it is not clear whether they do so primarily by increasing the likelihood of suicidal thoughts or by specifically increasing the likelihood of suicide attempts. Prospective studies with repeated assessments are needed to determine the degree to which experiences of loss, in particular, are associated with increased future risk for STBs and the degree to which this increased risk exceeds that associated with other preexisting risk factors (Liu & Miller, 2014).

Second, in several diathesis–stress models of STBs, it has been proposed that life stress interacts with various vulnerability factors to increase the probability of suicidal behavior (e.g., Beck, Brown, Berchick, Stewart, & Steer, 1990; Beck, Steer, Kovacs, & Garrison, 1985; Mann, 2003; Mann, Watson, Haas, & Malone, 1999). For example, Beck and colleagues suggested that individuals with a negative view of the future (i.e., hopelessness) may be more likely to engage in suicidal behavior, especially in times of crisis, stress, or psychological disturbance (Beck et al., 1985, 1990). Although some cross-sectional studies have examined the degree to which STBs might be related to the combination of life stress and other vulnerability factors (e.g., O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004), few longitudinal studies have tested the moderation hypothesis that major life stresses such as losses may be related to risk primarily in the presence of other risk factors in youth or young adults (e.g., preexisting depression, hopelessness).

Third, the degree to which major loss life events are associated with increases in other risk factors for STBs, and conversely, the degree to which other risk factors for STBs are associated with increased likelihood of other stresses, has been understudied. In prospective studies, life stresses have been found to be associated with increases in risk factors, such as depression and

anxiety (e.g., Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013). In addition, prospective studies have demonstrated that factors such as depression and hopelessness may actually portend higher risk for life stresses, including losses (e.g., Joiner, Wingate, & Otamendi, 2005; Uliaszek et al., 2012; Wingate & Joiner, 2004). That is, as Hammen (2006) has noted, the occurrence of life stresses may not always be independent of other psychiatric risk factors, and some individuals may be at higher risk for both. Nonetheless, the reciprocal relationship between life events and psychiatric risk factors has not been demonstrated to our knowledge in a study focused on elucidating the risk for STBs.

Since 1991, we have been conducting a study of adolescents followed prospectively from the time of an index psychiatric hospitalization through young adulthood, repeatedly tracking factors at each assessment such as major loss life experiences and STBs at each assessment. This study provides an excellent opportunity to examine the prospective relationships between the loss-related stresses and STBs. The first purpose of this study was to examine the degree to which occurrences of major loss life events were associated with increases in STBs. We were particularly interested in the degree to which major loss life events were independently associated with STBs after considering levels of depression, hopelessness, and anxiety over the follow-up, as well as prior history of suicide attempts. A second purpose of the study was to examine moderation of the relationship between loss and STBs—specifically, whether individuals with relatively higher levels of hopelessness, depression, and anxiety were more likely to engage in future STBs following loss experiences than individuals with relatively lower levels of hopelessness, depression, and anxiety. The final purpose of this study was to examine the degree to which major loss life events were associated with subsequently higher levels of risk factors (i.e., hopelessness, depression, anxiety) for STBs and, conversely, the degree to which

hopelessness, depression, and anxiety were associated with greater risk for later major loss life events.

METHODS

Participants

The 180 participants in this study were recruited from consecutive discharges from an inpatient psychiatric unit for adolescents in an academic medical center between September 1991 and April 1995. The sample included adolescents both with and without histories of suicide attempts. The inclusion criteria were as follows: (1) ages 12–18 at index hospitalization; (2) hospitalization for at least 10 days (hospital admissions were considerably longer on average at the time this sample was recruited than they are contemporarily; NAPHS, 1991); (3) ability to cooperate with and complete the assessments in the hospital (e.g., not actively and persistently psychotic); and (4) residence in North Carolina or Virginia at the time they were approached regarding study participation. The exclusion criteria were as follows: (1) serious systemic physical disease such as seizure disorder or insulin-dependent diabetes mellitus; (2) evidence of intellectual disability from testing, or medical or academic records; and (3) having a sibling already enrolled in the study.

To recruit the sample, we attempted to contact with 225 adolescents and their families one-half year after their discharge from the hospital. One teenager died of cardiac problems prior to recruitment. We were able to find and contact 96% of the remaining sample, and of these, were able to recruit a total sample of 180 (83.7% recruitment rate). By gender and ethnicity, the study sample included 91 girls and 89 boys, of which 80% were European American, 16.7% were African American, and the remainder were Hispanic American, Native American, or Asian American. At the date of discharge from the index hospitalization,

the mean age of this sample was 14.8 years ($SD = 1.6$; range: 12.0–18.4). Sixteen percent of youths were in the custody of the Department of Social Services at the beginning of the study, and the socioeconomic status of the remaining families was classified using the Hollingshead (1957) index as I (highest): 3.3%, II: 12.6%, III: 21.9%, IV: 29.8%, and V (lowest): 32.4%.

Study recruitment occurred over 4 years, and the young people who were recruited in the earlier stages of the study have been followed for a longer period of time, on average, than participants who were recruited later. As of the cutoff for these analyses (8/13/2005), participants in the study had been followed up to 14 years (mean = 11.2, $SD = 3.5$). By this cutoff, a cumulative 9.4% ($n = 17$) of the sample had dropped out of the study, and 3.9% ($n = 7$) of participants had died; none of the deaths were due to suicide, as far as we could ascertain from records and family members. The mean age of the participants as of the cutoff date for analyses, or the last date of assessment for participants no longer in the study, was 26 years ($SD = 4.0$; range 12.9–31.4). As described by Goldston et al. (2009), participants who died or dropped out of the study did not differ from the other participants in the age at which they were hospitalized, gender, or the number of suicide attempts prior to the index hospitalization, but a greater proportion of individuals lost to death and attrition were European American.

Participants were assessed initially during their index hospitalization. The repeated follow-ups initially were scheduled every 6 to 8 months and subsequently were tapered to being scheduled annually. The scheduling of follow-up assessments also varied within and between participants due to various reasons, including their schedules, staff shortages, and occasions when participants moved without providing contact information (and hence were temporarily “lost”). The median amount of time prior to the first and second follow-up assessments was 8.2 and 8.4 months,

respectively, whereas the median time between subsequent assessments was 10.3 months. The total number of assessments by the cutoff date for this report was 1,870. The average number of research assessments was 10.4 ($SD = 4.1$; range: 2–22).

Instruments

Assessment of Suicide Ideation and Attempts. At the initial hospitalization, STBs were assessed using the semistructured psychiatric diagnostic interview, the Interview Schedule for Children and Adolescents (ISCA; Kovacs, Pollock, & Krol, 1997; Sherrill & Kovacs, 2000). Supplementary information also was obtained from interviews with parents and treatment records. In the follow-up assessments, information regarding STBs since the last assessment was assessed with the ISCA, or after participants' 18th birthdays, the Follow-up Interview Schedule for Adults (FISA; Kovacs, Pollock, & Krol, 1995; Sherrill & Kovacs, 2000). *Suicide ideation* was defined as thoughts about engaging in suicidal behavior, regardless of intent associated with these thoughts. *Suicide ideation with a method envisioned* was coded when a participant reported suicidal thoughts and a possible method of attempting suicide, regardless of intent to act on these thoughts. A *suicide attempt* was defined as a self-inflicted act associated with at least some psychological intent to end one's life regardless of ambivalence or multiple motivations (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). Self-harm behaviors (e.g., self-cutting) not associated with any intent to kill oneself were not coded as suicide attempts.

At each assessment, participants were rated as to their most severe level of STBs since their last follow-up assessment (or since the index hospitalization): (1) no suicidal thoughts, (2) suicidal thoughts but no means envisioned, (3) suicidal thoughts with means envisioned, (4) single suicide attempt, and (5) multiple suicide attempts. These ratings have been shown to have

high interrater reliability (96.4% agreement, $\kappa = .92$; Goldston et al., 2015) and to differentiate between different trajectories of STBs over time (Goldston et al., 2016).

Assessment of Major Loss Life Events.

The focus of this study was on major loss life events. We focused on losses for several reasons: (1) Loss has been described in the literature as potentially related to risk for suicidal behavior even after considering other risk factors (Beautrais et al., 1997; Dube et al., 2001; Fergusson, Woodward, & Horwood, 2000); (2) these experiences occur in both adolescence and young adulthood, the developmental periods traversed by our study; (3) preliminary work indicated that the presence/absence and the dates of major loss life events could be coded with a high degree of reliability; and (4) preliminary analyses indicated that we had sufficient power to reliably examine the effects of this class of life events. We operationally defined *losses* as including death of a close family member or close friend, breakup of a romantic relationship, loss of custody of a child, or loss of contact with a child. In this definition, we relied on participants' verbal reports as to whether relationships were "close."

All available information was used in coding major loss life events. Specifically, the occurrences and dates of major loss life events were coded from information (including time lines) gathered during the semi structured diagnostic interviews (ISCA or FISA), from treatment records, and from our modification of the Life Events Checklist (Johnson & McCutcheon, 1980). When participants could not provide precise dates for losses, but could describe a likely window of time during which the loss occurred, the dates were estimated as the midpoint of the defined period of time (Kovacs, Feinberg, Crouse-Novak, Paulauskas, & Finkelshtein, 1984). For a random sampling of 25% of subjects, we determined the presence and dates of major life events at each interview for a reliability check. Agreement between two independent coders as to the presence/absence of events was 92.5%

($\kappa = .85$). For events agreed upon by both coders, there was 97.9% agreement in the dates of events (within a 2-week window of time).

Several studies have indicated that major life stresses increase risk primarily in the 1 to 3 months following the event (Cooper, Appleby, & Amos, 2002; Foster, 2011). Hence, for purposes of statistical analyses, we considered the 3-month period following major losses to be periods of increased risk.

Assessment of Hopelessness, Depression, and Anxiety. Hopelessness and negative expectations regarding the future were measured at each assessment using the self-report Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974; Beck & Steer, 1988; Steer & Beck, 1988). The BHS has been documented to have high internal consistency (Osman et al., 2002; Steer, Kumar, & Beck, 1993a) and to have concurrent validity in adolescent samples (Goldston et al., 2001; Reinecke, DuBois, & Schultz, 2001; Rotheram-Borus & Trautman, 1988; Steer, Kumar, & Beck, 1993b). In this sample, BHS scores were found to predict repeat suicide attempts (Goldston et al., 2001). The BHS scale also has been found to have both trait and state characteristics, and to be associated with increased concurrent risk for suicide attempts (Goldston, Reboussin, & Daniel, 2006).

Depressive symptoms were assessed at each assessment using the Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988). The BDI has been shown to be reliable (Strober, Green, & Carlson, 1981) and internally consistent ($\alpha = .79$ to $.90$; Rotheram-Borus, Walker, & Ferns, 1996; Strober et al., 1981) in samples of psychiatrically hospitalized adolescents. In this sample, BDI total scores have been found to predict repeat suicide attempts (Goldston et al., 1999) and to have both trait and state characteristics (Goldston et al., 2006).

Anxiety was assessed using the Trait Anxiety Scale of the State-Trait Anxiety

Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI is a reliable and internally consistent measure ($\alpha = .90$; Spielberger et al., 1983). The Trait Anxiety Scale has been found to have both trait and state characteristics (Goldston et al., 2006) and to predict suicide attempts following hospitalization in this sample (Goldston et al., 1999).

Assessment of Sociodemographic Variables. Background variables including gender, ethnicity and race, and age at the time of hospitalization were recorded from treatment records. Information for coding socioeconomic status (parental education and employment) was collected with the Intake and Follow-Up Information Sheets. These data entry forms were modeled after similar structured forms developed by Kovacs (M. Kovacs, unpublished manuscript, University of Pittsburgh, 1982).

Statistical Methods

To examine the relationship between ratings of STBs and the 3-month periods of risk associated with major loss life events, we used generalized estimating equation (GEE) regression models with robust variance estimates. These models can accommodate both fixed covariates (time-invariant) and covariates that change over time (time-varying). The demographic variables of age at hospitalization, gender and race/ethnicity, and the number of suicide attempts prior to the index hospitalization were considered fixed covariates in models. Gender interactions were examined in all models, but were not included in final models because they did not contribute to the models.

To address the question of whether major loss life events were associated with increased severity of suicide thoughts and behaviors, we examined the 3-month period of risk following the occurrence of life events as a time-varying covariate in the GEE models. We then examined whether the 3-month window of time associated with major loss life events was associated with risk even after considering other risk

factors, including levels of depression, anxiety, and hopelessness at the last assessment (or at hospitalization). For the complementary question of whether the effects of life events were moderated by hopelessness, depression, and anxiety, we examined the interactions between periods of risk associated with major loss life events and the previously assessed values of hopelessness, depression, or anxiety. The dependent variable in these primary analyses was ratings of STBs, an ordinal outcome having a multinomial distribution. A cumulative logit link was used to examine the rating probabilities in relation to time-varying predictors and fixed covariates.

As follow-up to these analyses, we conducted additional analyses to determine whether changes in suicide ratings were primarily related to suicide ideation or suicide attempts. Using a series of dummy variables, we used GEE models to examine (1) no suicide ideation (rating of 0) versus suicide ideation (ratings of 1 and 2); (2) no suicide attempts (ratings of 0–2) versus suicide attempts (ratings of 3 and 4); and (3) suicide ideation versus suicide attempts.

GEE methods also were used to examine the degree to which life events were associated with subsequent increases in hopelessness, depression, and anxiety. In these models, the 3-month periods of risk associated with life events were considered time-varying covariates in separate models of hopelessness, depression, and anxiety. GEE approaches also were used to examine the degree to which levels of these three variables over the follow-up were predictive of subsequent life events. In these models, repeated assessments of hopelessness, depression, and anxiety were considered time-varying covariates in models of life events.

RESULTS

One hundred sixty-one participants (89% of the total sample) reported a major loss life event during the follow-up period. These participants reported a median of five

major loss life events (range of 1–22), for 947 total major loss life events.

As seen in Table 1, the 3-month period following the occurrence of major loss life events was associated with subsequent higher ratings of STBs, even after controlling for gender, race/ethnicity, and prehospitalization suicide attempts. Follow-up analyses indicated that this increase in risk was primarily attributable to an increase in suicide ideation.

In Table 2, the results regarding the relationship between major loss life events and STBs, while controlling for previous risk factors and possible moderation, are presented. Major loss life events, previous risk factors (depression, hopelessness, and anxiety), and their interactions were related to STBs. However, the interactions were in the opposite direction of those predicted. Namely, the major loss life events primarily increased risk in the presence of lower levels of previous risk factors. Follow-up analyses indicated that the increase in risk that occurred was primarily attributable to increased suicide ideation. However, major loss life events were related to suicide attempts in the model with depression. Similar to the moderation effect with suicide ideation, this increase in risk was primarily present when there were lower previous levels of depression symptoms.

Results of analyses examining the bidirectional relationship between major loss life events and other risk factors for STBs are presented in Table 3. Major loss life events were related to subsequent increased levels of depression and hopelessness. Conversely, previous hopelessness and anxiety were both predictive of subsequent major loss life events.

DISCUSSION

Although a relationship between life events such as losses and suicidal behavior has been documented in numerous cross-sectional studies, relatively little is known from prospective studies about how losses

TABLE 1
Major Loss Life Events Predicting Suicidal Thoughts and Behaviors (STBs)

Covariate	<i>b</i>	<i>SE</i>	<i>Z</i>	OR	<i>p</i>
Loss life events predicting a continuum of STBs					
Life events	0.633	0.151	4.19	1.88	<.0001
Age at hospitalization	0.004	0.074	0.05	1.00	.959
Prehospitalization attempts	0.060	0.084	0.72	1.06	.470
Race/ethnicity	0.190	0.329	0.58	1.21	.563
Gender	-0.183	0.238	-0.77	0.83	.442
Loss life events predicting suicide ideation					
Life events	0.769	0.169	4.55	2.16	<.0001
Age at hospitalization	0.035	0.073	0.48	1.04	.630
Prehospitalization attempts	0.034	0.092	0.37	1.03	.711
Race/ethnicity	0.135	0.320	0.42	1.14	.674
Gender	-0.258	0.237	-1.09	0.77	-.276
Loss life events predicting suicide attempts					
Life events	0.135	0.265	0.51	1.14	.610
Age at hospitalization	-0.040	0.144	-0.28	0.96	.783
Prehospitalization attempts	0.097	0.134	0.73	1.10	.468
Race/ethnicity	0.179	0.435	0.41	1.20	.681
Gender	0.041	0.391	0.10	1.04	.917
Loss life events predicting suicide ideation to attempts					
Life events	-0.413	0.308	-1.34	0.66	.179
Age at hospitalization	-0.066	0.116	-0.57	0.94	.570
Prehospitalization attempts	0.084	0.148	0.56	1.09	.573
Race/ethnicity	-0.040	0.372	-0.11	0.96	.915
Gender	0.233	0.366	0.64	1.26	.525

contribute to escalation of STBs, or the interplay of this relationship with prominent risk factors such as hopelessness and depression over time. In this prospective, naturalistic study, we were able to examine the risk associated with major loss life events among adolescents and young adults, the degree to which this risk was moderated by other risk factors, the relationship between losses and subsequent risk factors, and the degree to which other risk factors were predictive of later losses.

Major loss life events were related to increased risk of STBs, even after controlling for other risk factors. Follow-up analyses revealed that this finding was primarily attributable to increased risk for suicide ideation. The sole exception to this finding was the model in which previous levels of depression were included. In that model, both depression and major loss life events were related to increased

risk for suicide attempts. The overall pattern of findings dovetails with other findings (Borges et al., 2012; Kessler, Borges, & Walters, 1999), suggesting that the majority of risk factors for STBs are in actuality risk other factors primarily for suicide ideation. The relationship of major loss life events to increased suicide ideation complements other primarily cross-sectional findings regarding the relationship between life stresses and STBs. These findings are also consistent with theoretical models that stress the importance of factors such as thwarted belongingness or connectedness in the genesis of STBs (Joiner, 2005).

Clearly, not everyone who experiences major loss events contemplates or attempts suicide. In the context of trying to better understand different reactions to life events, we examined whether or not a diathesis-stress process among major loss life events and other risk factors might serve as a

TABLE 2

Major Loss Life Events Predicting Ratings of Suicidal Thoughts and Behaviors (STBs), Controlling for Prior Risk Factors, and Moderation

Covariate	<i>b</i>	<i>SE</i>	<i>Z</i>	OR	<i>p</i>
Loss life events predicting STBs, controlling for prior BHS, and moderation					
Life events	0.988	0.252	3.92	2.69	<.0001
Lagged BHS	0.140	0.022	6.53	1.15	<.0001
Lagged BHS × Life events	-0.116	0.037	-3.08	0.89	<.0001
Age at hospitalization	-0.019	0.089	-0.21	0.98	.833
Prehospitalization attempts	0.002	0.097	0.02	1.00	.981
Race/ethnicity	0.167	0.396	0.42	1.18	.674
Gender	-0.192	0.291	-0.66	0.83	.510
Loss life events predicting STBs, controlling for prior BDI, and moderation					
Life events	1.149	0.228	5.04	3.16	<.0001
Lagged BDI	0.085	0.010	8.56	1.09	<.0001
Lagged BDI × Life events	-0.077	0.017	-4.65	0.93	<.0001
Age at hospitalization	0.004	0.084	0.04	1.00	.964
Prehospitalization attempts	-0.031	0.092	-0.34	0.97	.733
Race/ethnicity	0.205	0.396	0.52	1.23	.605
Gender	-0.195	0.289	-0.67	0.83	.500
Loss life events predicting STBs, controlling for prior anxiety, and moderation					
Life events	3.034	0.712	4.26	20.78	<.0001
Lagged anxiety	0.062	0.009	7.26	1.06	<.0001
Lagged anxiety × Life events	-0.050	0.013	-3.83	0.95	<.0001
Age at hospitalization	-0.052	0.087	-0.60	0.95	.547
Prehospitalization attempts	-0.043	0.096	-0.42	0.96	.676
Race/ethnicity	0.155	0.388	0.40	1.17	.690
Gender	-0.095	0.284	-0.33	0.91	.738
Loss life events predicting suicide ideation, controlling for prior BHS, and moderation					
Life events	0.953	0.300	3.18	2.59	.002
Lagged BHS	0.109	0.023	4.82	1.12	<.0001
Lagged BHS × Life events	-0.105	0.052	-2.01	0.90	.0449
Age at hospitalization	0.001	0.086	0.01	1.00	.993
Prehospitalization attempts	-0.035	0.122	-0.29	0.97	.771
Race/ethnicity	0.188	0.396	0.48	1.21	.634
Gender	-0.267	0.289	-0.92	0.77	.356
Loss life events predicting suicide ideation, controlling for prior BDI, and moderation					
Life events	1.095	0.267	4.10	2.99	<.0001
Lagged BDI	0.067	0.011	5.90	1.07	<.0001
Lagged BDI × Life events	-0.070	0.023	-3.01	0.93	.003
Age at hospitalization	0.007	0.083	0.08	1.00	.934
Prehospitalization attempts	-0.066	0.122	-0.54	0.94	.588
Race/ethnicity	0.195	0.385	0.51	1.22	.613
Gender	-0.285	0.290	-0.98	0.75	.325
Loss life events predicting suicide ideation, controlling for prior anxiety, and moderation					
Life events	3.205	0.865	3.71	24.7	<.001
Lagged anxiety	0.052	0.008	6.37	1.05	<.0001
Lagged anxiety × Life events	-0.054	0.016	-3.31	0.95	<.001
Age at hospitalization	-0.033	0.084	-0.40	0.97	.693
Prehospitalization attempts	-0.081	0.117	-0.69	0.92	.489

(continued)

TABLE 2
(continued)

Covariate	<i>b</i>	<i>SE</i>	<i>Z</i>	OR	<i>p</i>
Race/ethnicity	0.029	0.377	0.08	1.03	.938
Gender	-0.226	0.290	-0.78	0.80	.435
Loss life events predicting suicide attempts, controlling for prior BHS, and moderation					
Life events	0.604	0.491	1.23	1.83	.218
Lagged BHS	0.138	0.034	4.01	1.15	<.0001
Lagged BHS × Life events	-0.104	0.060	-1.74	0.90	.082
Age at hospitalization	-0.084	0.158	-0.53	0.92	.595
Prehospitalization attempts	0.129	0.140	0.92	1.14	.358
Race/ethnicity	0.375	0.559	0.67	1.45	.502
Gender	-0.054	0.456	-0.12	0.95	.907
Loss life events predicting suicide attempts, controlling for prior BDI, and moderation					
Life events	0.790	0.374	2.11	2.20	.035
Lagged BDI	0.076	0.015	4.95	1.08	<.0001
Lagged BDI × Life events	-0.068	0.021	-3.31	0.93	<.001
Age at hospitalization	-0.046	0.153	-0.30	0.96	.766
Prehospitalization attempts	0.058	0.128	0.45	1.06	.654
Race/ethnicity	0.285	0.574	0.50	1.33	.619
Gender	-0.115	0.457	-0.25	0.89	.802
Loss life events predicting suicide attempts, controlling for prior anxiety, and moderation					
Life events	1.141	1.159	0.98	3.13	.325
Lagged anxiety	0.052	0.016	3.32	1.05	<.001
Lagged anxiety × Life events	-0.019	0.021	-0.061	0.98	.354
Age at hospitalization	-0.133	0.021	-0.93	0.88	.354
Prehospitalization attempts	0.060	0.132	0.46	1.06	.649
Race/ethnicity	0.394	0.590	0.67	1.48	.504
Gender	-0.016	0.446	-0.04	0.98	.971

Note: In the ideation to attempt models, no covariates were significantly related to outcomes, so these models are not shown. BHS, Beck Hopelessness Scale; BDI, Beck Depression Scale.

mechanism for increasing risk for future STBs. Specifically, we examined three separate diatheses, including severity of depression, anxiety, and hopelessness prior to the life events, operating under the assumption that these vulnerabilities might increase risk for future STBs in the presence of stressors such as major loss events. The effects of major loss life events on STBs were moderated by severity of other risk factors, but in a direction that was opposite to that predicted by diathesis–stress models. Namely, loss events increased risk primarily when other risk factors were lower. The findings can be understood in part by the observation that life events were primarily associated with suicide ideation, rather than suicide

attempts. Higher levels of distress (as indicated by depression, hopelessness, and anxiety) were likely already associated with higher probabilities of suicidal thoughts. Hence, individuals were most likely to experience new suicidal thoughts following loss experiences when they previously had lower levels of distress.

Given that a diathesis–stress model was not sufficient for explaining the occurrence of STBs, we explored evidence of other processes or relationships between risk factors that might confer risk. We were particularly interested in whether proximal risk factors such as major losses served to increase subsequent levels of hopelessness, depression, and anxiety, or whether distal

TABLE 3

Examination of the Bidirectional Relationship Between Major Loss Life Events and Risk Factors for Suicidal Thoughts and Behaviors

Covariate	<i>b</i>	<i>SE</i>	<i>Z</i>	OR	<i>p</i>
Loss life events predicting subsequent BHS scores					
Life events	0.647	0.220	2.95		.003
Age at hospitalization	0.073	0.142	0.52	NA	.605
Prehospitalization attempts	0.194	0.193	1.00		.316
Race/ethnicity	0.119	0.553	0.22		.823
Gender	0.122	0.405	0.92		.764
Loss life events predicting subsequent BDI scores					
Life events	1.260	0.426	2.96		.003
Age at hospitalization	0.160	0.299	0.53		.594
Prehospitalization attempts	0.930	0.425	2.19	NA	.029
Race/ethnicity	-0.132	1.058	-0.13		.900
Gender	-0.106	0.854	-0.12		.901
Loss life events predicting subsequent anxiety scores					
Life events	0.957	0.612	1.56		.118
Age at hospitalization	0.632	0.513	1.23		.218
Prehospitalization attempts	1.577	0.670	2.35	NA	.019
Race/ethnicity	0.572	1.731	0.33		.741
Gender	-0.209	1.454	-0.14		.886
BHS predicting subsequent loss life events					
BHS	0.352	0.017	2.11	1.42	.035
Age at hospitalization	-0.107	0.055	-1.93	0.90	.053
Prehospitalization attempts	0.049	0.075	0.65	1.05	.515
Race/ethnicity	0.211	0.236	0.89	1.24	.372
Gender	0.173	0.193	0.89	1.19	.371
BDI predicting subsequent loss life events					
BDI	0.013	0.009	1.48	1.01	.139
Age at hospitalization	-0.096	0.055	-1.74	0.91	.083
Prehospitalization attempts	0.033	0.077	0.43	1.04	.668
Race/ethnicity	0.170	0.233	0.73	1.19	.465
Gender	0.134	0.193	0.69	1.14	.490
Anxiety predicting subsequent loss life events					
Anxiety	0.018	0.006	3.02	1.02	.003
Age at hospitalization	-0.106	0.055	-1.93	0.90	.054
Prehospitalization attempts	0.033	0.077	0.43	1.03	.666
Race/ethnicity	0.179	0.241	0.74	1.20	.459
Gender	0.171	0.198	0.86	1.19	.387

Note: BHS, Beck Hopelessness Scale; BDI, Beck Depression Scale.

risk factors such as hopelessness, depression, or anxiety increased risk for major life events and, in turn, subsequent risk for STBs. The results of this study provide some indications that major loss life events may increase risk, at least in part by increasing other risk factors for STBs such as depression and hopelessness. For

example, in this study, an individual's loss of custody of a child may have served to elicit or increase depression and feelings of hopelessness and, in turn, thoughts of suicide. Unfortunately, the design of this study precluded a closer examination of this process of mediation insofar as we did not have measurements of depression, hopelessness,

and anxiety between the life events and STBs. Nonetheless, these findings do provide some preliminary indications of a pathway by which major loss life events may lead to suicide thoughts.

The inverse of this relationship also seemed apparent; namely, distal risk factors such as hopelessness and anxiety may be related, in part, to increased risk of STBs because of their association with increased likelihood of subsequent major negative life events. Extending the findings by Hammen (1991, 2006, 2009) that increased depression may portend negative life events, we found that increased anxiety and hopelessness may also be associated with a higher likelihood of subsequent major losses. Thus, in considering an individual's risk for STBs, it is important to acknowledge the dynamic interrelationship between proximal and distal risk factors.

Although this prospective study informs our understanding of the associations among major loss life events, other risk factors, and future STBs, the present findings should be considered in the context of several limitations. First, our sample may not be representative of, or generalizable to, a broader clinical or community sample, as the adolescents enrolled in this study were recruited from a single, psychiatric inpatient setting. Second and relatedly, our sample was predominantly European American and mirrored the racial and ethnic population of our community. This prevented consideration of culturally specific or culturally bound life events as they relate to other proximal risk factors and distal risk factors and, in turn, risk for future STBs. Third, although dates of suicide attempts have been collected in this study, similar dates were not collected for most severe suicide ideation between follow-up assessments. Hence, we were not able to verify that increased severity of STBs always occurred subsequent to the major losses. Fourth, this prospective study traversed two developmental periods—adolescence and young adulthood. However, due to issues of multicollinearity when terms were introduced into our models to examine

developmental differences, we were not able to examine the relationship between loss events and how STBs changed over the course of development.

Last, in the present study, we focused only on major losses and a subset of risk factors (i.e., depression, anxiety, hopelessness, and history of suicide attempts). It is possible that we would have obtained a different pattern of results if we had focused on a greater range of life events or that different individuals may be reactive to different types of life stresses. Future research should consider whether the present study findings are relevant to other major life events, other types of life events such as daily life hassles or "minor life events," as well as other risk factors for suicide. In addition, future studies should consider the role of risk and protective factors as possible mediators or moderators of the association between life events and risk for STBs. For example, Kaplow, Gipson, Horwitz, Burch, and King (2014) found that emotional suppression (i.e., escape and/or avoidance-oriented coping) mediates the association between adverse life events and suicidal thoughts and attempts, even after controlling for demographic variables and depression. Given that individuals may respond to and cope with very similar major and minor life events differently, future research to address the role of protective factors (e.g., an individual's approach to problem solving or their capacity to regulate strong, negative emotions when confronted with life events) is needed.

In summary, this prospective longitudinal study among adolescents and young adults clarifies the interrelationship among proximal risk factors such as major loss life events and distal risk factors, including depression, anxiety, and hopelessness, for future STBs. As such, this study highlights the importance of understanding the dynamic interplay of major life events in relation to other psychiatric or historical distal risk factors as risk factors for future suicidal thoughts and behaviors, and has implications for clinical assessment and treatment practices.

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