

Emotion Regulation and Spillover of Interpersonal Stressors to Postsession Insight Among Depressed and Suicidal Adolescents

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Objective: Little is known about the extent to which previous weeks' stressful events spill over and influence adolescents' abilities to derive insight from treatment sessions. Even less is known about factors that moderate clients' vulnerabilities to these spillover effects. The current study examined the spillover of negative interpersonal events to postsession insight and the role of difficulties in emotion regulation in this spillover effect. **Method:** Participants were 129 adolescents with moderate to severe depressive symptoms and suicidal ideation ($M_{\text{age}} = 14.96$, 83% female, 56% African American/Black) participating in a comparative efficacy trial of Attachment-Based Family Therapy (ABFT) and Family-Enhanced Nondirective Supportive Therapy (FE-NST). A within-subject mediation model tested pre-session negative affect as a mediator of spillover of past week's events on postsession insight. We then examined baseline difficulties in emotion regulation (DERS) as a between-subjects moderator of the mediation model. **Results:** Negative affect partially mediated (44%) the spillover of the past week's negative events on adolescents' ratings of postsession insight ($p = .03$, 95% confidence interval, CI [- .09, -.002]). Baseline DERS increased adolescents' vulnerabilities to spillover effects ($p = .01$, 95% CI [- .28, -.03]). Negative interpersonal events from the past week influence pre-session negative affect and spill over to adolescents' abilities to gain insight from their treatment sessions. Adolescents who began treatment with greater DERS were particularly vulnerable to these spillover effects. Findings indicate the need for therapists to adapt sessions to individual differences in depressed and suicidal adolescents' exposure to negative interpersonal events preceding treatment and in their vulnerabilities to spillover and emotion dysregulation.

What is the public health significance of this article?

Adolescents vary in the degree to which the past week's negative interpersonal events spill over and reduce their abilities to gain insight from treatment sessions. Adolescents with difficulties in emotion regulation are particularly vulnerable to these spillover effects. Therapeutic strategies for reducing spillover effects and enhancing adolescents' abilities to gain insight from sessions are discussed.

Keywords: spillover, negative interpersonal events, session insight, emotion regulation

Therapists delivering evidence-based treatments often encounter the challenge of accommodating clients' experiences from the past week in the agenda for any particular therapy session. This challenge is especially difficult on weeks in which adolescents experience higher levels of negative interpersonal events that poten-

tially interfere with their abilities to gain new perspectives and insight from their treatment session. For example, adolescents who are more preoccupied and stressed by the past week's events may have difficulty attending to new information and perspectives introduced by their therapists. The negative emotions that accom-

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pany a stressful week's events may partially account for adolescents' reduced capacities to gain insight and new understandings from their treatment sessions (Bulmash, Harkness, Stewart, & Bagby, 2009; Monroe, Kupfer, & Frank, 1992; Quilty, Mainland, McBride, & Bagby, 2013; Weisz, Ng, Rutt, Lau, & Masland, 2013).

Although pretreatment assessments of interpersonal functioning have been linked to treatment response and attrition in depressed adult clients (McEvoy, Burgess, & Nathan, 2013), surprisingly little is known about how weekly fluctuations in negative interpersonal events spill over to adolescents' ratings of session insight. Further, even less is known about factors that influence adolescents' vulnerabilities to this spillover effect over the course of treatment. The current study addressed two gaps in the treatment literature. First, we tested a model in which there was spillover of weekly fluctuations in negative interpersonal events to depressed and suicidal adolescents' postsession ratings of insight derived from their therapy sessions. We expected this effect to be mediated through mood reactivity to the past week's events. Second, we examined individual differences in adolescents' vulnerabilities to spillover effects by testing a pretreatment measure of emotion dysregulation as a moderator of the spillover model.

The spillover model provides a useful framework for understanding how the prior week's interpersonal events carry over to adolescents' perceptions of insight derived from a treatment session. This model posits that negative experiences occurring in one life context carry over and influence functioning in another context (Larson & Almeida, 1999). Studies using intensive longitudinal designs have examined these spillover effects across several domains. In several adult samples, studies have examined how work experiences and marital conflict spill over to parent-child relationships (Repetti & Wood, 1997). More specifically, marital quality has been shown to spill over to parent-child relationships (Kouros, Papp, Goeke-Morey, & Cummings, 2014), and parents' stressful work experiences have been linked to same-day marital and parent-child conflicts (Nelson, Boyer, Villarreal, & Smith, 2016). Further, daily reports of marital conflict have been implicated in more negative parenting behaviors (Sears, Repetti, Reynolds, Robles, & Krull, 2016). In samples of adolescents, the spillover model has been used to examine how interpersonal stressors with parents and peers influence academic performance (Lehman & Repetti, 2007; Salamon, Johnson, & Swendsen, 2011). For instance, Flook and Fuligni (2008) found that adolescents reported more school adjustment problems on days that were preceded by higher levels of family stressors.

Although spillover effects have been investigated in both adult and adolescent samples, less is known about the mechanisms that explain these effects. Mood reactivity to negative interpersonal events is one putative mechanism (Suls & Martin, 2005). Insofar as negative interpersonal events generate negative affect, individuals who are more reactive to negative events are likely at an increased risk for spillover. Increased exposure to stressful events makes it more likely that individuals will experience increased negative mood and impaired functioning in new contexts (Salamon et al., 2011; Story & Repetti, 2006). Recent studies lend support for negative affect as a mechanism through which negative family interactions carry over to youths' academic performance (Lehman & Repetti, 2007), with negative mood mediating the spillover between parent-adolescent conflict and academic functioning

(Bai, Reynolds, Robles, & Repetti, 2016; Timmons & Margolin, 2015). Together, these findings suggest that changes in daily fluctuations of interpersonal stressors elicit increased negative affect, which, in turn, impedes functioning in other contexts.

Individual differences in symptoms may contribute to adolescents' vulnerability to spillover effects. Timmons and Margolin (2015) reported that anxiety and depressive symptoms increased adolescents' vulnerabilities for the spillover of parent-adolescent conflict to school functioning. Similarly, Kouros et al. (2014) found that parental depression moderated the spillover effect of parent marital quality to the parent-child relationship. Mood reactivity to interpersonal events may be more salient among depressed and suicidal adolescents. For instance, Weinberg and Klonsky (2009) found that an array of emotion regulation difficulties were associated with adolescents' depressive symptoms and suicidal ideation. More recent work with undergraduate students found that emotion regulation difficulties explained current suicidal ideation after controlling for depressive symptoms and the presence of mood or anxiety disorders (Rajappa, Gallagher, & Miranda, 2012). These findings suggest that difficulties with emotion regulation may contribute to depressed and suicidal adolescents' reactivity to interpersonal stressors.

Difficulty with emotion regulation, or the inability to appropriately identify, process, and respond to emotions, has also been posited as a risk factor for spillover effects across different contexts (Gratz & Roemer, 2004). Several studies also suggest that individuals with deficits in emotion regulation report more intense and enduring negative emotions and may experience difficulty compartmentalizing and responding to negative interpersonal events (Campbell-Sills & Barlow, 2007). A study that used daily diary assessments of socially anxious adolescents reported that emotion regulation moderated spillover effects among adolescents who engaged in more maladaptive emotion regulation strategies (Farmer & Kashdan, 2012). Another study indicated that emotion regulation capabilities influenced how youth with behavioral problems responded with more negative affect to stressful interpersonal events (Cummings, Davies, & Campbell, 2000).

Although the spillover model has been examined across work, family, and school contexts, studies using clinical samples have been limited to assessments of mood reactivity. For instance, depression has been linked to increased reactivity to interpersonal rejection (Nezlek, Kowalski, Leary, Blevins, & Holgate, 1997) and increased perseveration on negative thoughts and emotions after minor daily stressors (Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003). In the only study of spillover effects in a treatment context, Gunthert, Cohen, Butler, and Beck (2007) used a daily diary design to show that mood reactivity to negative events during the first week of cognitive therapy for depression was associated with poorer treatment response. Specifically, daily fluctuations in interpersonal stressors adversely affected both same-day and next-day mood and negative thinking. A follow-up study demonstrated that increased affective reactivity during the week preceding cognitive therapy resulted in less symptom reduction over the course of treatment (Cohen et al., 2008). These studies provide preliminary support that individuals whose mood is more reactive to negative interpersonal events may be less able to engage in and derive benefit from treatment.

To our knowledge, intensive longitudinal designs have not yet been used to examine if the past week's interpersonal events spill over to clients' perceptions of the treatment session. A central challenge in extending the spillover model to treatment process is assessing the client's perception of the extent to which a treatment session was helpful or beneficial. One potential indicator of session benefit is clients' ratings of postsession insight gained from each treatment session (Riemer & Kearns, 2010; Stiles, 1980). Clients' perceptions of insight share some common elements with other indices of clients' perceptions of the impact of a treatment session. For example, clients' perceptions of treatment helpfulness (Addis & Jacobson, 1996) and perceptions of session progress (Kolden, 1996) have both been linked to symptom change and treatment outcome. These earlier studies point to the utility of assessing clients' perceptions of their treatment sessions as an indicator of treatment benefit and outcome. Accordingly, clients' ratings of session insight may provide clinicians with valuable information for making decisions that enhance treatment outcomes and efficacy.

Current Study

The current study was designed to extend the spillover model to examine how adolescents' mood reactivity to the past week's negative interpersonal events influenced their postsession insight ratings in a treatment study of suicidal and depressed adolescents. A within-subject mediation model tested whether pre-session negative affect mediated the spillover of past-week negative interpersonal events to adolescents' ratings of insight after each treatment session. The within-subject mediation model hypothesized that: (a) adolescents' postsession insight would be reduced during weeks marked by more negative interpersonal events, and (b) heightened pre-session mood reactivity would mediate this spillover effect. Second, to examine individual differences in adolescents' vulnerabilities to spillover effects, difficulties with emotion regulation was examined as a between-subjects moderator of the within-subject mediation model. We expected that difficulties in emotion regulation would increase adolescents' susceptibility to spillover effects after controlling for baseline demographic characteristics, symptom severity, and treatment condition.

Method

Participants

Participants were 129 adolescents between the ages of 12 and 18 ($M_{\text{age}} = 14.96$, $SD = 1.66$) participating in a comparative efficacy trial (clinical trial registration: clinicaltrials.gov: identifier: NCT01537419) of Attachment-Based Family Therapy (ABFT; Diamond, Diamond, & Levy, 2014) and Family-Enhanced Nondirective Supportive Therapy (FE-NST; Brent & Kolko, 1991). Adolescents and their families were referred from hospitals, emergency rooms, physicians, and schools in the greater Philadelphia area. Interested families completed an initial phone screening. Adolescents were eligible to participate in the study if they endorsed severe suicidal ideation (i.e., a score of >31 on the Suicidal Ideation Questionnaire-Junior,

SIQ-JR; Reynolds, 1988) and moderate levels of depressive symptoms (i.e., a score of >20 on the Beck Depression Inventory-II, BDI-II; Beck, Steer, & Brown, 1996). In addition, willingness of a parent or caregiver (e.g., foster parent, grandparent, or step-parent) to participate in the treatment was required. Families were excluded if the adolescent posed an imminent risk of harm to self or others, endorsed psychotic symptoms, or had severe cognitive impairment. Further, adolescents were not included if they had recently initiated antidepressant medication before the baseline assessment.

The sample consisted of primarily female adolescents (83%) and was racially diverse, with adolescents self-identifying as: African American/Black (56%), White (31%), Native American (6%), Asian (2%), and other (13%). Sixteen percent of the sample identified as Hispanic. The average income-to-needs ratio for this sample was 2.07 ($SD = 1.45$), with 31% of adolescents living below the poverty line. Less than half (43%) of the sample reported living in a two-parent household, with 45% of adolescents living with a single parent, 7% with cohabiting parent and partner, and 5% with other relatives. Approximately 53% of adolescents reported previous behavioral or emotional treatment, with the majority of these adolescents previously receiving treatment for less than 6 months. Furthermore, about 27% of adolescents were currently taking antidepressant medication at the beginning of treatment.

Procedure

The study was conducted in compliance with the Institutional Review Board of the universities involved. Eligible adolescents and their caregivers provided assent and consent to voluntarily participate in the study. Families completed a baseline assessment, which included a battery of demographic, personality, and symptom severity measures. After this assessment, participants were randomly assigned to one of the two 16-week treatments: ABFT or FE-NST. After randomization, nine families chose to withdraw. A consort diagram depicting the total flow of participants is included as Figure 1. The remaining 120 adolescents completed weekly pre-session and postsession assessments. Suicidal and depressive symptoms were assessed at the end of treatment.

Treatments

Attachment-Based Family Therapy. ABFT is a 16-week treatment designed for adolescents between the ages of 12 and 18. Grounded in attachment theory, ABFT provides an interpersonal, process-oriented approach to treat adolescent depression, suicidality, and trauma. ABFT aims to improve the parent-adolescent relationship by repairing attachment ruptures that underlie family conflict. ABFT consists of both adolescent-only and parent-adolescent sessions. For a more complete overview of ABFT and a review of existing empirical support, see Diamond, Russon, and Levy (2016).

Family-Enhanced Nondirective Supportive Therapy. FE-NST consists of 16 weekly sessions focused on developing a supportive relationship between adolescents and their clinicians. These sessions rely on reflective listening and responding to client-reported issues. FE-NST is a version of the Supportive Relationship Treatment Manual (Brent & Kolko, 1991), which was modified in this study to contain additional parent psychoeducation sessions to supplement the adolescents' treatment.

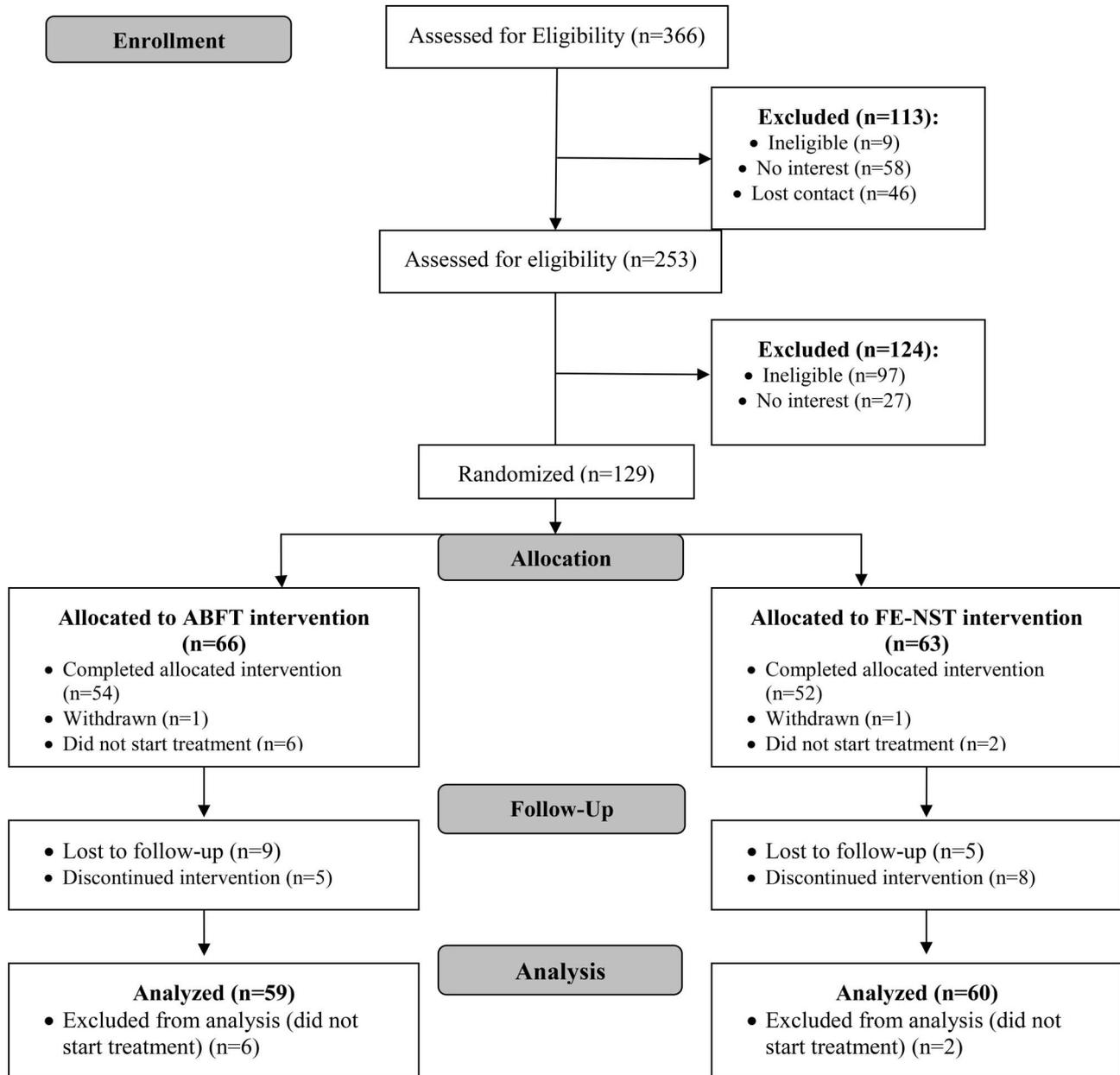


Figure 1. Consort diagram.

Measures

Baseline assessments.

Demographics. Parents and adolescents completed standard demographic forms, which included information such as the adolescent's age, gender, and ethnicity as well as measures of socioeconomic status.

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Adolescents completed a 36-item self-report measure assessing multiple facets of emotion regulation. Sample items include: "when I'm upset, I feel guilty for feeling that way," "when I'm upset, I lose control over my behaviors," and "I have difficulty making sense out of my feelings." Items were scored on a 5-point

scale, ranging from 1 = *almost never* to 5 = *almost always*. A total DERS score was derived and demonstrated high reliability (Cronbach's $\alpha = .90$).

The Suicidal Ideation Questionnaire—Junior (SIQ-JR; Reynolds, 1988). Suicidal severity was assessed at baseline and posttreatment using a 15-item self-report measure evaluating the severity and frequency of adolescents' suicidal ideation in the past month. Sample items include: "I thought if I had the chance, I would kill myself," "I thought that killing myself would solve my problems," and "I thought about how I would kill myself." Items were scored on a 7-point scale, ranging from 0 = *I never had this thought* to 6 = *almost every day*. A total

score was calculated, which showed high reliability (Cronbach's $\alpha = .84$).

Beck Depression Inventory-II (BDI-II; Beck et al., 1996). Adolescents completed the 21-item self-report measure at baseline and posttreatment to assess the severity of depressive symptoms during the past 2 weeks. Sample indicators include: pessimism, self-criticism, loss of interest, and loss of energy. Scores for each item ranged from 0 to 3, with higher scores indicating increasing levels of depressive severity. Baseline scores showed high reliability (Cronbach's $\alpha = .85$).

Pre-session assessments.

Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988). Pre-session negative affect was measured using the negative affect subscale from the PANAS, which is comprised of 10 items. Sample items include: "distressed," "ashamed," and "nervous." Items were scored on a 5-point scale ranging from *very slightly or not at all* to *extremely*. A subscale score was created using the negative affect items, with higher scores indicating more negative affect. This composite variable showed high reliability (Cronbach's $\alpha = .87$).

Weekly interpersonal events. Adolescents indicated the extent to which they experienced weekly negative interpersonal events with their parents and peers using a 7-item measure derived from previous daily diary research studies (see Herres & Kobak, 2015). Four parent events ("you talked back to a parent," "you were yelled at by a parent," "you argued with a parent," "your parent cursed at you") and three peer events ("you got into a fight with another kid," "you argued with another kid," "another kid disrespected you") were combined to yield a total negative interpersonal events variable. Items were rated as 1 = *not at all*, 2 = *a little*, 3 = *somewhat*, and 4 = *a lot*. For parent-specific questions, adolescents reported average ratings of 6.41, with a *SD* of 2.77 across the 16 weeks of treatment. For peer-specific questions, adolescents reported an average rating of 4.09, with a *SD* of 2.09. A total weekly composite score of parent and peer events was calculated when at least 80% of the data was available. This composite variable at baseline showed acceptable reliability (Cronbach's $\alpha = .75$).

Post-session assessments.

Youth Counseling Impact Scale—Insight Subscale (YCIS-v.2; Kearns, Athay, & Riemer, 2012). Adolescents' perceptions of gained insight after each treatment session were assessed using a 3-item subscale from the YCIS. The three items were: "I now understand my feelings better," "I now have a better idea about how I can deal with my problems," and "I now understand better what my strengths are." Items were scored on a scale from 1 = *not at all* to 5 = *totally*. A total score was calculated with higher scores reflecting greater perception of post-session insight. This subscale score showed high reliability (Cronbach's $\alpha = .80$).

Data Analytic Plan

Analyses were conducted using Mplus Version 7.0 (Muthén & Muthén, 1998–2015). We performed a within-subject (1→1→1) multilevel mediation analysis (Bauer, Preacher, & Gil, 2006; Bolger & Laurenceau, 2013), with the proposed predictor (weekly interpersonal events that occurred the week before the treatment session), mediator (pre-session negative affect), and dependent variable (post-session insight) entered as within-subject, time-

varying variables measured across the 16 weeks of treatment. This approach allows for the use of full maximum likelihood estimation to account for missing data, which does not rely on the assumption of normality and accounts for uneven clusters of data (Bauer et al., 2006).

This model examined the relationships between weekly fluctuations of negative interpersonal events, negative affect, and ratings of session insight and provided estimates of average random effects for each individual. Weekly measures of client insight were regressed onto weekly stressful life events to create the random slope effect, which is the "c" coefficient. Negative affect was regressed onto stressful life events to create a random slope effect of the "a" path. Finally, insight ratings were regressed onto negative affect to create a random slope effect of the "b" path. All time-varying, within-subject variables were person-mean centered. This approach accounts for each individual's average levels of the variables of interest and provides an indicator of weekly fluctuations from his or her own average. As a consequence of this centering, intercepts for the *m* and *y* equations were fixed to zero.

To test our moderation hypotheses, baseline DERS was included as a between-subjects moderator of each of the mediational pathways. Additionally, baseline symptom severity, treatment condition, and sociodemographic variables were entered as exploratory covariates. All between-subjects variables were grand-mean centered.

Results

Missing Data

There were 129 adolescents completed the baseline assessment. After randomization, nine families withdrew from the study. The mediation analyses, therefore, consisted of 120 adolescents who started treatment. The average total number of treatment sessions attended was 9.29 sessions, with 69% of adolescents completing at least eight sessions and approximately 54% of adolescents completing 10 or more sessions. All variables in the mediation model were completed at individual treatment sessions. Therefore, the number of completed sessions provides an index of missing data on all variables of interest included in the final data analyses. The number of completed sessions was not related to adolescent age ($p = .58$), gender ($p = .54$), treatment condition ($p = .62$), or baseline symptom severity of suicidal ideation or depressive symptoms ($p = .52$, $p = .62$, respectively). Therefore, missing data at the within-subject level was assumed to be random.

Preliminary Results

Descriptive and zero-order correlations for demographic variables, treatment condition, symptom severity, and participants' average weekly levels of negative events, negative affect, and post-session insight are presented in Table 1. Adolescents' baseline difficulties in emotion regulation were positively associated with baseline symptom severity, age, and average levels of negative affect across the 16 weeks. Female adolescents reported higher levels of baseline depressive symptoms than did males. Older adolescents reported lower average ratings of session insight. Adolescents randomized to the ABFT condition reported lower average negative affect and negative interpersonal across the 16

Table 1
Descriptive Statistics and Zero-Order Correlations ($N = 129$) Among Study Variables

Study variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
(1) Age	14.96	1.66	—												
(2) Gender	.17	.38	-.04	—											
(3) Race	.31	.46	.12	-.08	—										
(4) Income-needs	2.08	1.44	-.01	-.01	.44**	—									
(5) Treatment condition	.51	.50	-.05	-.01	.06	.08	—								
(6) Baseline DERS	104.42	20.74	.22*	-.03	.17	-.11	-.06	—							
(7) Baseline BDI	35.62	9.30	.18*	-.18*	.09	-.10	.07	.49**	—						
(8) Baseline SIQ	49.89	.41	.03	-.003	-.10	-.11	.04	.22*	.41**	—					
(9) Average negative events	10.88	2.82	-.02	.10	-.06	-.11	-.22*	.26**	.14	-.12	—				
(10) Average negative affect	24.15	7.42	.12	-.14	.13	-.02	-.21*	.42**	.45**	.15	.24*	—			
(11) Average session insight	10.23	2.93	-.21*	.06	-.16	-.01	-.11	-.21	-.18	-.38**	.01	-.21*	—		
(12) Posttreatment BDI	18.13	14.08	.15	-.12	.15	.08	-.01	.34**	.46**	.22*	.08	.62**	-.47**	—	
(13) Posttreatment SIQ	20.89	16.80	.18	-.003	.36**	.25**	-.09	.35**	.33**	.28**	.03	.46**	-.47**	.70**	—

Note. DERS = difficulties in emotion regulation; BDI = Beck Depression Inventory; SIQ = Suicidal Ideation Questionnaire. Gender was coded as 0-female, 1-male. Race was dummy-coded as 0-non-White, 1-White, Treatment condition was coded as 0-NST, 1-ABFT.

* $p < .05$. ** $p < .01$.

treatment sessions than adolescents in the FE-NST condition. Further, adolescents with higher average ratings of session insight reported lower levels of suicidal ideation and depressive symptoms at the end of treatment (Week 16). There was no significant correlation between baseline symptom severity and average interpersonal events across the 16 weeks of treatment. Adolescents' weekly reports of interpersonal events were not assessed during the baseline intake assessment but only at the beginning of the first treatment session. Because depressive symptoms were not measured weekly, we could not examine fluctuations of interpersonal events and depressive symptoms. However, there was a significant association between average weekly events and weekly suicidal ideation, $r = .27$, $p = .003$. Therefore, it is likely that the lack of correlation at baseline depressive/suicidal symptoms and weekly events is because of different assessment time periods (baseline vs. pre-session measures).

Within-Subject Mediation Model

The first aim of this study was to test whether negative affect mediated the spillover of negative interpersonal events on adolescents' ratings of insight. Path coefficients and significance levels are depicted in a path model in Figure 2. The mediation results of the within-subject model are presented in Table 2.

The *a* path: Stressful life events to negative affect. The *a* path in the model was significant, with weekly stressful events showing a positive association with pre-session negative affect. On average, a one-unit increase in stressful events resulted in a 0.58-unit increase in negative affect ($p < .001$). This finding indicates that, on average, adolescents reported higher pre-session negative affect after weeks of higher frequencies of negative interpersonal events. This random slope had a *SD* of 0.52 and approximately 95% of adolescents' slopes ranged from 0.44 to 1.60. This shows that, while there is substantial between-subjects variance, the relationship between negative interpersonal events and pre-session negative affect was positive for most adolescents.

The *b* path: Negative affect to post-session insight. The *b* path in the mediation model was also significant, indicating a negative association between pre-session negative affect and post-session insight. Results indicated that, on average, a one-unit increase in negative affect predicted a 0.04-unit reduction in client insight scores ($p = .04$). Therefore, on average, higher pre-session negative affect was related to decreases in ratings of session insight. This random slope was found to vary ($SD = 0.14$) with slopes for about 95% of adolescents in the range of -0.32 to 0.24 . This variance suggests substantial between-subjects variability, such that for some adolescents, the relationship between negative

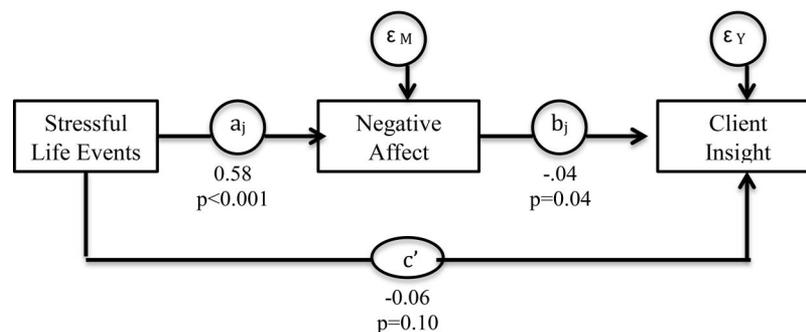


Figure 2. Path coefficients for within-subjects mediation of negative affect on the link between stressful interpersonal events and ratings of client insight across 16 weeks of treatment.

Table 2
Results for the Within-Subject Mediation: Negative Affect Mediating the Link Between Stressful Interpersonal Events and Client Ratings of Postsession Insight

Effect	Estimate	SE	z	p	95% CI	
					Lower	Upper
Mediator model: Stressful life Events → Negative Affect*						
Negative affect						
Time	-.10	.02	-5.71	<.001	-.13	-.07
Stressful interpersonal events (<i>a</i> path)	.58	.09	6.69	<.001	.42	.76
Outcome model: Negative Affect → Client Insight†						
Client insight						
Time	.03	.01	3.52	<.001	.01	.04
Negative affect (<i>b</i> path)	-.04	.02	-2.02	.04	-.09	-.001
Stressful interpersonal events (<i>c'</i> path)	-.06	.03	-1.64	.10	-.12	.01
Mediation effects						
Mediated effect	-.04	.02	-2.05	.030	-.09	-.002
Total effect	-.10	.03	-2.94	<.001	-.17	-.03
Percent mediated effect	.44	.22	2.00	.045	.01	.88
Correlation metric (<i>ab</i>)	-.24	.20	-1.19	.234	-.62	.15

* $p < 0.001$. † $p < 0.15$.

affect and ratings of session insight was negative, while for other adolescents, higher ratings of pre-session negative affect were related to greater session insight.

The *c'* path: Stressful life events to postsession insight, controlling for negative affect. Results indicated a nonsignificant direct effect of negative events on ratings of insight for the average adolescent, after controlling for negative affect ($p = .10$). This suggested that, after accounting for the role of negative affect, there was no significant association between weeks marked by increased negative interpersonal events and postsession insight ratings.

Mediated and total effects. Parameter estimates for the mediated effects can be found in Table 2. An average total effect across all adolescents (c) was calculated by summing the average direct effect (c'), the product of the average A and B effects (ab), and the covariance of between-subjects differences in those effects (σ_{ajbj} ; see Bolger & Laurenceau, 2013). The total effect (the c path) of negative interpersonal events on postsession insight, without controlling for negative affect, was significant ($p < .001$), with a one-unit increase in stressful life events predicting a 0.10-unit reduction in client insight scores. Negative affect accounted for 44% of the overall average relationship between stressful life events and ratings of insight after individual treatment sessions. This percent-mediated effect was significant ($p = .04$).

Level 2 Between-Subject Moderation

The second aim of this study was to explore DERS moderation on the spillover effect of interpersonal events on session insight. Exploratory analyses also tested the moderating effects of sociodemographic variables, baseline symptom severity, and treatment condition in the spillover model. The results of the between-subjects model are presented in Table 3 and described below.

Difficulties in emotion regulation. To test our final hypothesis, the DERS was examined as a between-subjects moderator of

the spillover effect. In addition, exploratory moderation tests of the additional mediation pathways were conducted. The estimated random effects for each mediation pathway were regressed on the DERS total score (continuous). Baseline levels of symptom severity, sociodemographic variables, and treatment condition were included as covariates in the between-subjects model. Our results indicated that DERS did not moderate the relationship between interpersonal events and pre-session negative affect (a path) or the link between pre-session negative affect and ratings of postsession insight (b path). However, DERS did moderate the direct spillover effect (c' path). Adolescents reporting greater levels of emotion dysregulation at baseline had a steeper slope between negative events and insight after controlling for negative affect ($p = .01$). Next, as a post hoc probe of the DERS moderation, we created z -scores of the DERS variable and created a high DERS (1 SD) versus low DERS (-1 SD) variable. Figure 3 shows the effect of levels of emotion dysregulation above and below the sample mean on the direct link between weekly fluctuations in interpersonal stressful events and ratings of postsession insight.

Treatment condition. Treatment condition was included as a between-subjects moderator of all the pathways in the mediation model. Results indicated no significant differences in mediation pathways between adolescents in the ABFT and FE-NST conditions (all $ps > 0.49$).

Baseline suicidal ideation. Results showed that baseline levels of suicidal ideation moderated the relationship between pre-session negative affect and ratings of postsession insight (b path). Higher levels of baseline suicidal ideation contributed to steeper declines between pre-session negative affect and ratings of postsession insight ($p < .001$), indicating that adolescents with greater suicidal ideation at baseline have greater mood reactivity when reporting on session insight.

Age and gender. Results showed that older adolescents provided lower ratings of postsession insight after increased feelings

Table 3
Between-Subject Moderation Effects on Mediation Pathways

Effect	Estimate	SE	z	p	95% CI	
					Lower	Upper
Stressful life Events → Negative Affect (<i>a</i> path)						
Age	.01	.06	.12	.91	-.10	.11
Gender	-.10	.24	-.40	.69	-.56	.37
Treatment condition	-.11	.18	-.64	.53	-.46	.23
Baseline SIQ	.003	.01	.40	.69	-.01	.02
Baseline BDI	-.01	.01	-1.06	.29	-.04	.01
DERS	.04	.19	.19	.85	-.33	.41
Negative Affect → Client Insight (<i>b</i> path)						
Age	-.03	.01	-2.67	.01	-.05	-.01
Gender	-.04	.05	-.80	.42	-.15	.06
Treatment condition	-.02	.04	-.57	.57	-.09	.05
Baseline SIQ	-.01	.001	-4.03	<.001	-.01	-.003
Baseline BDI	.001	.003	.48	.63	-.004	.01
DERS	.06	.04	1.39	.16	-.02	.14
Negative Events → Client Insight (<i>c'</i> Path)						
Age	.01	.02	.34	.73	-.03	.04
Gender	-.22	.09	-2.56	.01	-.39	-.05
Treatment condition	.04	.06	.69	.49	-.08	.17
Baseline SIQ	.001	.002	.47	.64	-.003	.01
Baseline BDI	-.004	.004	-.89	.38	-.01	.01
DERS	-.16	.063	-2.47	.01	-.28	-.03

Note. DERS = difficulties in emotion regulation; BDI = Beck Depression Inventory; SIQ = Suicidal Ideation Questionnaire.

of pre-session negative affect (*b* path; $p = .01$). Gender also played a role in the direct link between weekly fluctuations in interpersonal stressful events and ratings of post-session insight (*c'* path), with boys reporting less insight after weeks of increased stressful interpersonal events after controlling for negative mood ($p = .01$).

Treatment history. Results indicated that history of psychological treatment did not have a significant effect on the link between interpersonal events and post-session insight (*c'* path, $p = .98$) spillover path. Similarly, the role of antidepressant medication use was nonsignificant on the *c'* path ($p = 0.63$).

Discussion

The findings supported a spillover model of past week's negative interpersonal events on adolescents' ratings of insight derived

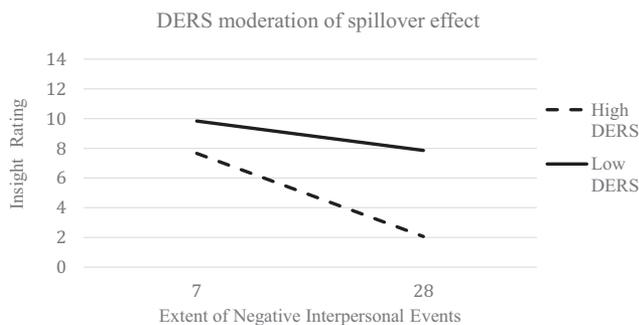


Figure 3. Difficulties in emotion regulation moderates the link between negative events and session insight ratings (after controlling for covariates).

from that week's treatment session. More specifically, after weeks where adolescents experienced relatively higher levels of negative events, they reported less insight gained from their treatment session. Approximately 44% of this spillover effect was mediated by pre-session negative affect, which leaves a substantial portion of the spillover effect unexplained. The partial mediation points to the consideration of additional mechanisms, such as coping responses or cognitive appraisals, that may account for how a more stressful week influences clients' perceptions of insight derived from their treatment session (Larson & Almeida, 1999; Repetti, Wang, & Saxbe, 2009). Additional analyses also provide preliminary support for the association between session insight and post-treatment symptom severity. Adolescents who reported higher levels of session insight averaged across 16 sessions had lower depressive and suicidal symptoms at the end of treatment (see Table 1). This supports a previous literature highlighting the utility of clients' perceptions of session effectiveness accounting for treatment outcomes across an array of treatment types (Reynolds, Taylor, & Shapiro, 1993; Riemer & Kearns, 2010; Stiles & Snow, 1984).

Baseline assessments of difficulties in emotion regulation did not moderate mood reactivity to negative interpersonal events (*a* path) or the link between pre-session negative mood and post-session insight (*b* path). However, difficulties in emotion regulation did moderate the direct spillover link between negative interpersonal events and session insight. This interaction effect indicated that adolescents with more emotion regulation difficulties were more vulnerable to the past week's interpersonal stressors spilling over to session insight. Several maladaptive cognitive processes have been posited as a putative mechanism of the spillover model (Cropley & Purvis, 2003; Repetti et al., 2009; Wenzel, Gunthert, Forand, & Laurenceau, 2009). These processes may account for

the effect of adolescents' emotion regulation on spillover in our model. First, youths' difficulties in identifying and understanding their emotional responses may increase negative biases in their appraisals of interpersonal events (Brenner & Salovey, 1997; Smith, 2001), resulting in continued rumination about the past week's events. Research suggests that ruminative processes interfere with engagement in effective and structured problem solving (Carver, Scheier, & Weintraub, 1989; Nolen-Hoeksema, Morrow, & Fredrickson, 1993). Second, the increased need to allocate attentional and cognitive resources to managing negative appraisals may reduce adolescents' reflective capacities for developing alternative coping strategies for accomplishing adaptive goals (Gohm & Clore, 2000).

Although not a primary aim of the current study, several included covariates moderated different paths in the mediation model of spillover effects on session insight. Baseline levels of suicidal ideation moderated the effect of pre-session negative affect on session insight (*b* path). Specifically, adolescents with greater symptom severity reported less post-session insight on days with relatively higher levels of pre-session negative mood. Adolescents' age also moderated the relationship between pre-session negative affect and post-session ratings of session insight (*b* path), such that older adolescents were more reactive to pre-session mood than younger adolescents in their reports of post-session insight. Gender moderated the direct spillover effect (*c*' path), whereby boys were more likely to be reactive to negative interpersonal events when reporting post-session insight than were girls. This finding is inconsistent with previous studies of community samples, which report girls as more reactive to interpersonal stressors than boys (Hankin, Mermelstein, & Roesch, 2007). However, because the small percentage of boys in our clinical sample, this finding should be interpreted with caution.

Clinical Implications

The spillover of past week's events to ratings of insight has several implications for treating depressed and suicidal adolescents. First, pre-session negative mood partially mediated the spillover effect. This suggests that addressing an adolescent's mood reactivity at the beginning of a session may reduce spillover to the adolescent's ability to derive insight from that session. Considering that mood only partially mediated the spillover effect, it is important to consider other, potentially cognitive mechanisms through which interpersonal events spill over to impact session insight. For instance, treatment providers may support highly reactive adolescents by developing skills for more effectively processing and managing their negative interpersonal experiences from the past week. By doing so, clinicians may improve adolescents' abilities to benefit from the treatment session and more effectively implement planned session agendas, particularly in sessions after weeks in which adolescents have experienced more negative interactions with peers or family. By incorporating cognitive reappraisal and coping skills into the early parts of treatment, therapists may mitigate the potential of spillover on the insight that adolescents derive from the treatment session. Our findings showed no significant treatment differences in the spillover model between ABFT and FE-NST, suggesting that the potential for interpersonal stress to interfere with treatment progress may present as a generic problem across treatment modalities.

As such, more research into specific treatment strategies that can be used to mitigate spillover effects is warranted.

Clinicians should also be prepared to accommodate treatment to baseline differences in adolescents' symptom severity and capacities for emotion regulation. Adolescents who experience more difficulties regulating their emotions may warrant supplemental sessions to specifically target enhancing their emotion regulation skills, provided this is not already included in the treatment agenda. Indeed, teaching adolescents how to accurately identify and respond to their emotions has been shown to promote treatment outcomes (Berking et al., 2008; Gratz & Tull, 2010). Findings also suggested that pretreatment symptom severity affected the spillover model. More specifically, adolescents with more baseline suicidal ideation tended to report less post-session insight on days marked with relatively higher levels of pre-session negative mood. However, results indicated no significant effects of baseline symptom severity on the spillover of interpersonal events to post-session insight. We speculate that this may be because of greater emotional flooding related to suicidal ideation that may not be present with depressive symptoms. It is also important to note that there is a restricted range of baseline depressive symptoms given the study's inclusion criteria. Nonetheless, more research is needed on strategies for addressing pre-session negative mood in the early parts of treatment to reduce spillover effects over the course of treatment.

Limitations and Future Directions

The current findings have several notable limitations. First, the generalizability of the findings is limited to samples of clinically depressed and suicidal adolescents. The spillover of stressful interpersonal events to post-session insight may differ for clients experiencing other forms of psychopathology. Additionally, adolescents received two specific treatment modalities (i.e., ABFT and FE-NST). Although the two treatments varied in organization and structure, both treatments consisted of 16 weekly, individual sessions, with occasional family/caregiver involvement. Thus, spillover effects may differ in other treatments for depressed and suicidal adolescents, particularly treatments that focus on individual skill development such as cognitive-behavioral therapy (CBT) or interpersonal therapy for adolescents (IPT-A). Additionally, negative affect and past week's interpersonal events were measured concurrently before the treatment session. Ideally, reactivity to life stressors should be assessed using lagged analyses in a daily diary design (Laurenceau & Bolger, 2005). In the current study, biased reporting of weekly events because of current mood may have inflated the relation between past week's events and negative mood. Finally, this study relied on the use of self-report measures. Future studies should aim to incorporate multiple reporters of interpersonal events and mood to strengthen measurement of these constructs.

Future research should extend our findings by measuring cognitive and emotional processes as potential mechanisms that may influence clients' abilities to derive new learning and insight from their treatment sessions. In addition, further investigation into the role of emotion regulation in the spillover model is warranted. Specifically, a more thorough examination of different facets of emotion regulation may be useful in identifying specific treatment targets for intervention. Finally, preliminary analyses showed a

significant correlation between average ratings of session insight and posttreatment symptom severity, suggesting the need to further examine the relationship between postsession insight and treatment outcomes.

Conclusion

This study supported a partial within-subject mediation model in which negative affect partially explained the spillover of negative interpersonal events to postsession insight. Furthermore, we identified adolescents with difficulties in emotion regulation as particularly vulnerable to this spillover effect. Using an intensive longitudinal design, our findings add to the limited available literature examining the role of interpersonal stressors on treatment process among depressed and suicidal adolescents. Future research should aim to extend these findings across different treatment modalities and across a range of adolescent psychopathologies. In addition, future research should explore additional cognitive mechanisms of spillover effects to provide a more comprehensive understanding of the spillover model.

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