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Caregiver-Child Co-Rumination and Treatment Outcomes in a Randomized Clinical Trial of Rumination-Focused Cognitive-Behavioral Therapy

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Co-rumination and RF-CBT Outcomes

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Abstract

A number of developmental factors increase risk for adolescent rumination. This particular kind of repetitive negative thinking pattern often begins in the context of familial stressors and parental modeling. Though rumination can be effectively targeted with rumination-focused cognitive behavioral therapy (RF-CBT), it is unknown whether caregiver-child co-rumination (1) affects caregiver views of their child's psychopathology, (2) or interferes with youth rumination- focused treatment. The present study uses data from a randomized clinical trial of RF-CBT to examine whether caregiver-child co-rumination, or caregivers' own rumination patterns, are associated with bias in parental perception of their adolescent's depression symptoms. We also examine if co-rumination scores at baseline moderate rumination scores for youth at treatment termination, and whether treatment effects dampen or decay more significantly post-treatment among youth with higher caregiver-child co-rumination. Youth (N = 76) were randomized to either 10-14 sessions of RF-CBT (n = 38) or treatment as usual (TAU; n = 38) and completed interviews and surveys at pre-treatment baseline, post-treatment, and 3-, 6-, 9-, and 12-month follow up. Results indicate that neither caregiver rumination nor co-rumination scores bias caregivers' views of their child's depression symptoms. In terms of reduction in child's rumination scores, estimated treatment effects were larger for patients with higher baseline co - rumination scores, and there was no statistically significant difference in treatment effect decay over time in high versus low co-rumination groups. Results indicate co-rumination overall does not dampen the effect of RF-CBT, and those experiencing the highest levels of co-rumination may benefit most from

treatment.

Introduction

The term *co-rumination* refers to talking about one's problems with another person in a way that is excessive, repetitive, passive, speculative, and focused on negative emotions and consequences[1]. This behavior emerges as an (often ineffective) attempt to seek social support and manage distress by the disclosing individual[2]. Unfortunately, co-rumination appears to increase the salience of perceived problems and amplifies negative affect without generating actionable solutions[3]. Thus, this interpersonal process is theorized to increase depressive thinking patterns (e.g., self-criticism, maladaptive attributions) and exacerbate stress response[4]. Research has found that adolescent co-rumination with peers and their mothers is indeed linked to internalizing psychopathology like depression[5-7]. Although co-rumination is detrimental, persons tend to engage in this type of conversation in the context of close, confiding relationships[1, 8]. Taken together, findings indicate that co-rumination is an unproductive emotion regulation strategy that adolescents tend to use with close others like parents and peers.

Preliminary data suggest that co-rumination increases risk for depression and other internalizing pathology indirectly via increasing solitary rumination (or the mental tendency to passively and repeatedly focus on one's distress and its associated causes and consequences) [9-11]. Importantly, rumination often begins in the context of familial stressors[12]. Some have argued that caregivers may inadvertently socialize rumination in their children by failing to teach or support more adaptive and action-oriented emotion regulation strategies, especially for events eliciting sadness or anger[13]. These caregivers may instead suggest or more subtly reinforce disengagement strategies[14-15]. A sizable literature supports the roles of parental modeling and reinforcing avoidant behavior in the etiology of youth worry and anxiety[16], which are forms of repetitive negative thinking. Despite evidence pointing to the family environment as a training ground for the ruminative process, literature relevant to the intergenerational transmission of rumination itself is mixed.

Some studies find that maternal rumination reduces interactive parenting behavior and disrupts parent/child relationship quality[17-18]. Research shows that parenting styles characterized by high control and protectiveness are also associated with youth rumination[19-21]. One recent systematic review found a number of associations between parenting behavior and adolescent rumination[19]. Specifically, adolescent rumination was positively correlated with parental control, emotional abuse, negative affectivity, and authoritarian parenting, and negatively correlated with positive affectivity, low control, parental solicitation, and authoritative parenting. Of particular relevance to co-rumination, one study found maternal encouragement of emotional expressivity predicted increased rumination among daughters[22], while another found a family style characterized by passive expression of negative emotions during early childhood predicted greater levels of rumination among youth by adolescence[23].

In contrast, one study that more directly investigated intergenerational transmission of rumination failed to find support for this developmental pathway. Dunning and colleagues[24] examined whether maternal rumination prospectively predicted their child's rumination via parenting behaviors (i.e., psychological control) and family functioning (i.e., communication, affective expression, involvement). They also tested whether intergenerational transmission predicted internalizing symptoms among adolescents. Results indicated that maternal rumination did not directly predict adolescent rumination; nor were there indirect effects of maternal rumination on adolescent rumination via parenting behaviors

or family functioning. Although higher maternal rumination did predict less effective parenting and more maladaptive family characteristics at follow-up, these factors did not influence adolescent rumination.

In summary, evidence for the intergenerational transmission of rumination is limited to date. However: (1) caregiver socialization around problem-solving and emotion regulation can increase risk for rumination[23], (2) co-rumination appears to increase risk for solitary or individual rumination among youth[10], and (3) there is an extensive literature supporting the robust link between rumination and internalizing symptoms[25-26]. The pathway from rumination to psychopathology is well established and forms the rationale for rumination-focused cognitive behavioral therapy (RF-CBT)[27]. While initially developed for adults, our group has adapted RF- CBT for youth and found success in reducing both rumination and the recurrence of depression[28-30]. However, further exploration is needed to examine how factors unique to youth may impact the effectiveness of RF-CBT.

Adolescents are embedded in a family environment that likely influences how psychopathology is perceived, how coping skills are deployed and reinforced, and whether treatment is effective. Youth rarely seek therapy independently, and parents often make vital care decisions based on their perception of youth symptoms. Research shows that parental affect, expectations, and beliefs impact how much attention and emphasis they place on child symptoms[31]. Yet it is presently unknown whether caregiver engagement with rumination impacts how they view their child's related symptoms (does caregiver engagement with rumination obscure their understanding of their child's degree of struggle with depression?). It is also unclear whether familial co-rumination affects the success of youth treatment targeting solitary rumination (does co-rumination dampen RF-CBT efficacy?). Understanding more about the potential influence of the family environment may aid in tailoring interventions to youth and more effectively address factors that can hamper treatment response.

The present study uses data from a randomized clinical trial of adolescent RF-CBT to examine three secondary aims (NCT03859297)[30,32]. First, we sought to examine whether caregiver engagement in ruminative processes with their child (co-rumination) and/or caregivers' own experiences with solitary rumination are associated with bias in their perception of their adolescent's current depression symptoms. Parents' own experience with rumination may either normalize or amplify concerns about their child's symptoms. Bias was operationalized as a greater discrepancy between caregiver scores and both child and independent evaluator[1] scores on the Children's Depression Rating Scale-Revised (CDRS-R; described below)[33]. Our hypotheses associated with this first aim were somewhat exploratory, as we were unsure *a priori* whether any potential bias would result in caregivers under or overestimating youth symptoms.

Second, we aimed to examine whether caregiver-child co-rumination scores would moderate rumination-related outcomes for youth at treatment termination. We hypothesized that co- rumination scores may moderate the relation between RF-CBT exposure (RF-CBT vs. treatment as usual; TAU) and treatment outcomes (rumination scores) for youth, such that higher engagement in co-rumination with a caregiver would dampen treatment benefit between pre- and post-intervention measurements, as compared to family environments characterized by lower co- rumination scores. Third, we examined differences in the rates of treatment effect decay between high versus low co-rumination subgroups and

[1]Independent evaluators were graduate students, research associates, or faculty that held a master's level degree or higher.

between high versus low caregiver rumination subgroups from pre- to post-treatment and across follow -up time points.

Materials and Methods

Participants

Data were obtained as part of a larger clinical trial (NCT03859297) examining the use of RF-CBT to reduce risk for depression recurrence among adolescents with a history of depression (currently remitted) and ongoing high levels of rumination. The primary aims of the larger study were to examine whether the intervention could reduce rumination and prevent depression recurrence. Youth ages 14-17 (67% female) with a history of depression in the broader community were recruited through radio advertisements, social media, and electronic medical records. Primary exclusion criteria included active suicidal plan or intent, psychotic disorder, bipolar disorder, and autism spectrum disorder. Participants were also excluded if they were currently experiencing a depressive episode as determined by the Kiddie Schedule for Affective Disorders and Schizophrenia-Present and Lifetime Version (KSADS-PL)[34] and/or a score of 46 or higher on the Children's Depression Rating Scale-Revised (CDRS-R). See Langenecker et al. (2024)[30] for additional details on trial protocol and eligibility criteria. Written consent and assent were obtained from adolescents and a legal guardian prior to enrollment. All procedures performed in this study were in accordance with the ethical standards of the Institutional Review Board of the University of Utah.

Measures

Rumination

To address the primary outcome, self-reported engagement in rumination was assessed with the Rumination Response Scale (RRS)[35]. Caregiver and youth were both given the RRS at baseline pre-treatment, post-treatment, and at 3-, 6-, 9-, and 12-month post-treatment follow-ups. This 22-item questionnaire uses a 4-point Likert scale (1 = *almost never*, 2 = *sometimes*, 3= *often*, 4 = *almost always*) to assess rumination patterns, with scores ranging from 44 to 88.

Co-rumination

Co-rumination was assessed via the 27-item co-rumination questionnaire[1], completed by the caregiver at baseline pre-treatment, post-treatment, and 3-, 6-, 9-, and 12-month post- treatment follow-ups. Caregivers were specifically instructed to provide ratings based on their co-rumination with their child. This instrument examines co-rumination among three content areas on a 5-point Likert scale (1 = *not at all true*, 2 = *a little true*, 3 = *somewhat true*, 4 = *pretty true*, 5 = *really true*), with scores ranging from 27 to 135.

Depression

Youth depression was assessed via the KSADS-PL and CDRS-R completed by the youth, their caregiver, and a trained independent evaluator at pre-treatment baseline. Youth depression was also assessed via the Reynolds Adolescent Depression Scale Short-Form (RADS-SF)[36] completed by both youth and caregiver at pre-treatment baseline and post-treatment. The RADS- SF is a brief 10-item measure used to assess depressive symptoms on a 4-point Likert scale (1 = *almost never*, 2 = *hardly ever*, 3 = *sometimes*, 4 = *most of the time*), with scores ranging from 10 to 40.

Procedure

At pre-treatment baseline, enrolled youth completed the RRS and RADS-SF, while their caregiver completed the RRS and the co-rumination questionnaire. Caregivers and youth also completed the CDRS-R, along with an independent evaluator from the study team. Additional baseline characteristics were captured and are presented in Table 1. Eligible youth were then randomized to either RF-CBT (10 -14 weekly sessions) or TAU (assessment only for 10-14 weeks). TAU included 13 individuals with continuing or new psychotherapy, ranging from continuing supportive therapy to new cognitive-behavioral therapy. Additional information regarding randomization can be found in Langenecker et al., 2024[30]. Upon completion of the intervention or assessment period, RRS, RADS-SF, and co-rumination were reassessed. RRS and co-rumination were also completed at 3-, 6-, 9-, and 12-month post-treatment completion.

Statistical Analysis

We summarized baseline characteristics using the mean and standard deviation for continuous variables that are approximately normally distributed (see Table 1). For continuous variables that have a skewed distribution, we computed the median and the 25th and 75th percentiles. We presented the frequency and proportion for categorical variables. To investigate the association between baseline co-rumination and baseline caregiver solitary rumination with bias in caregiver's perception of their child's psychopathology (aim 1), we considered two outcomes defined as 1) the absolute difference between baseline caregiver and child CDRS scores, and 2) the absolute difference between baseline caregiver and independent evaluator's CDRS scores. Both outcomes were log-transformed to ensure they are approximately normally distributed. For aim 1, we formulated two multivariable linear models to include baseline co- rumination and baseline caregiver solitary rumination, separately, as the independent variable while adjusting for child age, child sex, maternal education (as a proxy for familial socioeconomic status[37]), and family income as potential confounders. Covariates for all analyses were decided *a priori* to analysis. For aim 2, we investigated whether the caregiver-child co- rumination scores moderate the treatment effects of RF-CBT on child rumination (RRS) and depression (RADS). We formulated linear models where child rumination and depression scores at immediate post-treatment were treated as the outcome, and treatment, baseline co-rumination scores, and the interaction between treatment and baseline co-rumination scores were treated as the independent variables. The models were also adjusted for child rumination and depression scores at baseline.

Finally, for aim 3, we first estimated the rates of decay in the effect of treatment on child rumination in the subgroups of high versus low caregiver rumination scores and caregiver-child co-rumination scores, separately. We used their median scores as the cutoffs for dichotomization. We modeled the outcome of child rumination over five time-points, post-treatment, 3-, 6-, 9-, and 12-month follow-up, by formulating two linear mixed-effect models. The models included treatment assignment, time, and a treatment-time interaction as independent variables, and baseline child's rumination score as a covariate. To examine differences in the rates of decay between high versus low co-rumination subgroups and between high versus low caregiver rumination subgroups, we tested the significance of three-way interaction terms between treatment, time, and caregiver rumination level, and separately, between treatment, time, and co- rumination level. We also estimated the effect of RF-CBT versus TAU on caregiver-child co- rumination score using an analysis of covariance model where the baseline co-rumination score was included. All analyses were conducted using R version 4.3.0 (a nlme package was used for all linear mixed effects models)[38].

Table 1. Detailed Baseline Demographic Variables

Characteristic	Overall, N = 76	AO, N = 38	RFCBT, N = 38
Age	15.79 (1.05)	15.95 (0.96)	15.63 (1.13)
Sex			
Male	25 (33%)	13 (34%)	12 (32%)
Female	51 (67%)	25 (66%)	26 (68%)
Gender			
Cismale	17 (28%)	7 (26%)	10 (29%)
Cisfemale	33 (54%)	15 (56%)	18 (53%)
Transgender male	1 (1.6%)	1 (3.7%)	0 (0%)
Transgender female	1 (1.6%)	0 (0%)	1 (2.9%)
Non-binary	4 (6.6%)	2 (7.4%)	2 (5.9%)
Other	5 (8.2%)	2 (7.4%)	3 (8.8%)
Unknown	15	11	4
Ethnicity			
Hispanic or Latin(e)	10 (13%)	4 (11%)	6 (16%)
Not Hispanic or Latin(e)	65 (87%)	33 (89%)	32 (84%)
Unknown	1	1	0
Race			
Caucasian/White	71 (95%)	37 (100%)	34 (89%)
Asian	2 (2.7%)	0 (0%)	2 (5.3%)
American Indian or Alaska Native	1 (1.3%)	0 (0%)	1 (2.6%)
Other or Unknown	1 (1.3%)	0 (0%)	1 (2.6%)
Unknown	1	1	0
Mother Education			
High school graduate or GED	5 (7.2%)	1 (2.9%)	4 (12%)
Some college but no degree	19 (28%)	8 (23%)	11 (32%)
College graduate	35 (51%)	22 (63%)	13 (38%)
Profession school (MA, MS, PhD, MD, etc.)	10 (14%)	4 (11%)	6 (18%)
Unknown	7	3	4
Family Income			
Less than $21,000	3 (4.2%)	2 (5.9%)	1 (2.7%)
$21,000 to $40,000	3 (4.2%)	1 (2.9%)	2 (5.4%)
$41,000 to $60,000	6 (8.5%)	3 (8.8%)	3 (8.1%)
$61,000 to $80,000	8 (11%)	4 (12%)	4 (11%)
$81,000 to $100,000	16 (23%)	4 (12%)	12 (32%)
Above $100,000	35 (49%)	20 (59%)	15 (41%)
Unknown	5	4	1
Sexual Orientation			
Straight	41 (68%)	17 (68%)	24 (69%)
Gay	1 (1.7%)	0 (0%)	1 (2.9%)
Lesbian	2 (3.3%)	1 (4.0%)	1 (2.9%)
Queer	4 (6.7%)	3 (12%)	1 (2.9%)
Pansexual	7 (12%)	2 (8.0%)	5 (14%)
Asexual	1 (1.7%)	1 (4.0%)	0 (0%)
Other	4 (6.7%)	1 (4.0%)	3 (8.6%)
Unknown	16	13	3

Table 2. Missing Responses at Each Assessment Point

Assessment	Pre - treatment	Post-treatment	3-months post treatment	6-months post treatment	9-months post treatment	12-months post treatment
Co-rumination	20	27	NA	NA	NA	52
Parent rumination	9	22	45	50	57	49
Child rumination	1	21	40	43	42	38
Child RADS	3	25	40	42	42	46

*N = 76 subjects

Results

Baseline characteristics

Detailed patient characteristics by treatment condition are shown in Table 1. The final sample in the present analyses (N = 76) were a mean age of 15.79 (SD = 1.05). The RF-CBT and TAU groups each consisted of 38 participants. Ninety-five percent of participants were White, with 13% identifying as Hispanic or Latin(e). Mean CDRS total score at baseline for the entire sample was 35.7 (SD = 7.64, e.g., cut-off for mild depression is 42).

Baseline child self-report rumination scores were significantly higher (p = 0.016), and RADS-SF was five points higher (p = .005) for the RF-CBT group compared to the TAU group. This imbalance between the groups on baseline scores is not uncommon in randomized clinical trials and was addressed by controlling for baseline scores in our models. The median (IQR) caregiver co-rumination score at baseline was 50 (*44, 65*) and 54 (*40, 68*) for the TAU and the RF-CBT, respectively (p = 0.8), suggesting groups were not significantly different at baseline. Missing responses at each assessment point are provided in Table 2.

Aim 1: Bias in caregiver perception of child's psychopathology as a function of their own rumination

There were no significant associations between the caregiver rumination scores and the discrepancy between caregiver and child's CDRS scores (capturing caregiver bias; β = 0.004 (95% CI: (-0.019, 0.027)) or between the co-rumination score and the discrepancy between caregiver and child's CDRS

Table 3. Association Between Caregiver Rumination and Co-Rumination, and Bias in Caregivers' Perception of their Child's Psychopathology

Outcome*	Caregiver – Child CDRS	Caregiver – Independent Evaluator CDRS
	Coef. (95% CI)	*Coef. (95% CI)*
Parent Rumination	0.004 (-0.019, 0.027)	0.002 (-0.017, 0.022)
Co-Rumination	-0.01 (-0.024, 0.003)	-0.007 (-0.019, 0.006)

*N = 76

Table 4. Treatment Effect Modification on Child Rumination and RADS at Immediate Post-Treatment.

	Child rumination* Coef. (95% CI)	**Child RADS** Coef. (95% CI)**
Therapy	17.48 (-4.87, 39.84)	4.56 (-6.69, 15.81)
Baseline co-rumination	0.12 (-0.08, 0.32)	-0.038 (-0.14, 0.06)
Baseline child rumination	0.62 (0.37, 0.87)	0.588 (0.29, 0.87)
Therapy: baseline co-rumination	-0.46 (-0.87, -0.05)	-0.157 (-0.36, 0.05)

*$N = 55$
**$N = 51$

scores (β = -0.0105 (95% CI: [-0.0239, 0.0029]) (see Table 3). The results were similar for where the modeled outcome was the discrepancy between caregiver and independent evaluator's CDRS (caregiver rumination: β = 0.002 (95% CI: [-0.017, 0.022]); co-rumination: β = -0.007 (95% CI: [-0.019, 0.006])).

Aim 2: Treatment effect modification on child rumination

Estimated treatment effects in terms of reduction in child RRS scores were larger for patients with higher baseline co-rumination scores (treatment and baseline co-rumination interaction effect: β = -0.46 (95% CI: [-0.87, -0.06]), Table 4). On the other hand, estimated treatment effects on child depression were similar across different levels of baseline co-rumination (treatment and baseline co-rumination interaction effect: β = -0.16 (95% CI: [-0.37, 0.05])).

Aim 3: Decay in treatment effect over time

Table 5. Decay in Treatment Effect on Child Rumination Over Time by Subgroup

Subgroup	**Child rumination* Coef. (95% CI)**	**Co-rumination** Coef. (95% CI)**
Baseline child rumination	0.3 (0.07, 0.53)	0.34 (0.11, 0.57)
Baseline co-rumination	0.12 (-0.12, 0.36)	0.09 (-0.27, 0.45)
Therapy	23.31 (-3.27, 49.89)	-3.85 (-32.22, 24.51)
Time – 3 month	4.11 (-9.94, 18.16)	-14.58 (-29.18, 0.03)
Time – 6 month	1.21 (-14.84, 17.26)	-3.72 (-19.84, 12.4)
Time – 9 month	5.91 (-10.9, 22.73)	-7.67 (-25.79, 10.44)
Time – 12 month	-9.2 (-23.85, 5.44)	-7.62 (-23.49, 8.26)
Therapy: baseline co-rumination	-0.52 (-1.01, -0.04)	-0.06 (-0.79, 0.66)
Baseline co-rumination: time 3 month	-0.22 (-0.48, 0.04)	0.18 (-0.18, 0.54)
Baseline co-rumination: time 6 month	-0.13 (-0.43, 0.17)	-0.07 (-0.48, 0.34)
Baseline co-rumination: time 9 month	-0.19 (-0.5, 0.12)	0.08 (-0.39, 0.54)
Baseline co-rumination: time 12 month	0.04 (-0.24, 0.32)	0.01 (-0.38, 0.4)
Therapy: time 3 month	-11.22 (-39.3, 16.87)	-3.84 (-33.06, 25.37)
Therapy: time 6 month	-15.21 (-47.34, 16.92)	17.34 (-14.89, 49.56)
Therapy: time 9 month	-21.01 (-54.62, 12.59)	-6.81 (-43.03, 29.41)

Therapy: time 12 month	9.47 (-19.83, 38.76)	8.68 (-23.05, 40.4)
Baseline co-rumination: therapy: time 3	0.18 (-0.34, 0.7)	-0.06 (-0.78, 0.66)
Baseline co-rumination: therapy: time 6	0.32 (-0.28, 0.92)	-0.38 (-1.2, 0.45)
Baseline co-rumination: therapy: time 9	0.33 (-0.3, 0.95)	0.08 (-0.84, 1.01)
Baseline co-rumination: therapy: time 12	-0.26 (-0.81, 0.3)	-0.28 (-1.07, 0.51)

*N = 44 subjects and 149 observations

** N = 52 subjects and 167 observations

For child RRS scores, there was no statistically significant difference in treatment effect decay in the high versus low co-rumination group (three-way interaction effects between treatment condition, baseline co-rumination category, and time were not statistically significant (Table 5)). The average co-rumination scores in the high versus low groups are 67.96 (SD = 10.58) and 40.07 (SD = 7.29), respectively.

Discussion

With the present study, we sought to explore how familial processes relevant to rumination may impact the effectiveness of RF-CBT among youth. Specifically, we explored (1) potential caregiver bias when identifying and reporting on their child's depressive symptoms as a result of their own engagement with the ruminative process, (2) whether youth RF-CBT treatment effects would differ based on experiences of co-rumination with a caregiver, and (3) whether treatment effects on youth rumination would decay more quickly in the context of high (versus low) co- rumination at home. While these results are preliminary due to the smaller sample size for three- way interactions, the main effect of treatment on co-rumination was encouraging.

Our exploration of potential caregiver bias indicates that adult experiences with rumination (whether co-rumination engagement with their child, or independent rumination) do not systematically bias their perception of their child's depression symptoms in comparison to child report of their own symptoms or ratings made by an independent evaluator. This result is promising, as caregivers are often vital informants for identifying and characterizing youth psychopathology, connecting their children to treatment, encouraging therapy engagement, and maintaining treatment gains. Discrepancy between caregiver and child reports of youth psychopathology is a long-recognized and common issue[39-40] that may be associated with adverse outcomes[41]. Our results indicate that caregiver engagement with rumination does not appear to be a source of reporter bias. This is important, as caregivers are often a key informant for conceptualizing youth psychopathology in clinical practice.

We also found that co-rumination engagement did not appear to dampen treatment effects at treatment termination or result in a more rapid/severe decay in benefit post-treatment. In fact, families that reported greater engagement in co-rumination at baseline had youth who benefited more from treatment, as measured by reductions on the RRS. Taken together, these results speak to the robustness of beneficial effects of RF-CBT on youth rumination. Treatment effects were observed even in the context of co-rumination in the family. It is possible that higher co- rumination at baseline may relate to greater engagement of both the youth and the caregiver in therapy. Specifically, youth within families who tend to co-ruminate may begin to integrate skills and other therapy content within the context of co -rumination, potentially increasing their opportunity to ingrain more adaptive habits. The current preliminary analysis can be repeated in the R33 phase, when we have a larger sample and a more robust comparison group (e.g., RF- CBT vs. relaxation therapy, which should not change rumination or

co-rumination).

As with all research, this study has some notable limitations. Caregiver-child co-rumination is largely understudied in comparison to youth-peer co-rumination and thus, any examination is valuable in the context of youth internalizing pathology. However, we only examined caregiver reports of co-rumination without peer contexts, and we were not able to assess co-rumination shifts over the course of treatment. We also examined these patterns across all caregiver/child dyads and were not powered to examine potentially unique effects of mother/father and daughter/son pairings. As data for these analyses were drawn from a larger study evaluating youth treatment response, a more detailed evaluation of caregiver-child co-rumination with more frequent assessment points and more complete follow-up is warranted. The original trial was not designed for an analysis of the type conducted here, but we were encouraged to explore the relationships based on literature that was published after the trial was started, and to inform hypotheses for future work. In this pilot trial, many participants missed assessment windows during our lengthy follow-up period, resulting in significant reductions in power when examining related questions (see Table 2). The R61 phase of the study was powered for a sample size of 30 per cell to obtain an effect size change of .5 SD with .80 power. This was designed as a simple t-test change difference between the change in the TAU group and the change in the RF-CBT group, in which the actual effects were notably stronger [30]. Our sample was also largely white, female, cisgender, and non-Hispanic, which may limit the generalizability of our results. Finally, the effects of caregiver rumination and co-rumination on report-bias were only examined in the context of adolescent depression; caregiver rumination has not yet been assessed with other relevant forms of psychopathology, such as adolescent anxiety.

Conclusion

Despite limitations, our preliminary results indicate that caregiver-child co-rumination did not reduce the effectiveness of RF-CBT among youth or result in greater decay of treatment benefits over time. This positively speaks to the strength of the intervention among youth. However, future work would likely still benefit from the explicit integration of familial involvement with the therapeutic process, as this may further increase the effectiveness of the intervention. Overall, this study highlights the importance of examining environmental factors that may influence treatment outcomes for youth with depression. Continued work is needed to evaluate other unique aspects of youth's social systems in an effort to most effectively leverage interventions. In particular, further research is needed to test whether similar patterns emerge with respect to co-rumination with friends and peers, given the increasing importance of such relationships during the adolescent period.

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