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Please cite the final published version:

del Palacio-González A, Clark DA, O'Sullivan LF. Cognitive processing in the aftermath of relationship dissolution: Associations with concurrent and prospective distress and posttraumatic growth. *Stress and Health*. 2017;33:540–548. <https://doi.org/10.1002/smi.2738>

Publication metadata

Title:	Cognitive processing in the aftermath of relationship dissolution: Associations with concurrent and prospective distress and posttraumatic growth
Author(s):	del Palacio-González A, Clark DA, O'Sullivan LF
Journal:	Stress and Health
DOI/Link:	https://doi.org/10.1002/smi.2738
Document version:	Accepted manuscript (post-print)

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Cognitive Processing in the Aftermath of Relationship Dissolution: Associations with Concurrent
and Prospective Distress and Posttraumatic Growth

Adriana del Palacio-González^{1, 2}, David A. Clark¹, & Lucia F. O'Sullivan¹

¹ *University of New Brunswick, Canada*

² *Center on Autobiographical Memory Research, Aarhus University, Denmark*

Author note

Adriana del Palacio-Gonzalez (Corresponding author), Center on Autobiographical Memory Research, Department of Psychology and Behavioural Sciences, Aarhus University; *David A. Clark*, Department of Psychology, University of New Brunswick; *Lucia F. O'Sullivan*, Department of Psychology, University of New Brunswick.

Acknowledgments. The first author was supported by the Danish National Research Foundation under Grant DNRF89 during the preparation of this manuscript. Thanks to Alberto Imparato for creating the figure of this paper.

Correspondence concerning this article should be addressed to Adriana del Palacio-Gonzalez, Center on Autobiographical Memory Research, Department of Psychology and Behavioural Sciences, Aarhus University, Bartholins Allé 9, Building 1351- 427, 8000 Aarhus C, Denmark, delpalacio@psy.au.dk, Phone: (+45) 26343648.

Abstract

Non-marital romantic relationship dissolution is amongst the most stressful life events experienced by young adults. Yet, some individuals experience posttraumatic growth following relationship dissolution. Little is known about the specific and differential contribution of trait-like and event-specific cognitive processing styles to each of these outcomes. A longitudinal design was employed in which trait-like (brooding and reflection) and dissolution-specific (intrusive and deliberate) cognitive processing were examined as predictors of growth (Posttraumatic Growth Inventory) and distress (Breakup Distress Scale) following a recent relationship dissolution. Initially, 148 participants completed measures of trait-like and dissolution-specific cognitive processing, growth, and distress (T1). A subsample completed a seven-month follow-up (T2). Higher frequency of relationship-dissolution intrusive thoughts predicted concurrent distress after accounting for brooding and relationship characteristics. Further, higher brooding and lower reflection predicted higher distress prospectively. Concurrent growth was predicted by both higher brooding and more deliberate relationship-dissolution thoughts. Prospectively, T1 dissolution intrusive thoughts predicted higher T2 deliberate thoughts, and the interaction between these two constructs predicted higher T2 growth. Therefore, deliberately thinking of the dissolution was related to positive psychological outcomes. In contrast, intrusive dissolution cognitions and a tendency for brooding had a mixed (paradoxical) association with psychological adjustment.

Keywords: rumination, intrusive thoughts, posttraumatic growth, breakup distress, deliberate thoughts, relationship dissolution

Cognitive Processing in the Aftermath of Relationship Dissolution: Associations with Concurrent and Prospective Distress and Posttraumatic Growth

Young adults identify romantic relationship dissolution as one of the most stressful, often traumatic, life events they experience (Cameron, Palm & Follette, 2010; Monroe, Rohde, Seeley, & Lewinsohn, 1999). Non-marital relationship dissolution may result in comparable (Cameron, et al., 2010) or even greater (Gold, Marx, Soler-Baillo, & Sloan, 2005) symptoms of posttraumatic stress disorder than traumatic events as defined in the DSM 5 (American Psychiatric Association, 2013). Relationship dissolution is associated with emotional volatility, decline in life satisfaction, academic problems, greater psychiatric symptoms, sleep problems, and alcohol use (Chung & Hunt, 2014; Chung, et al., 2003; Field, Diego, Pelaez, Deeds, & Delgado, 2009, Rhoades et al., 2011; Sbarra & Emery, 2005). Humiliating social rejection in general (Kendler, Hettema, Butera, Gardner, & Prescott, 2003), and relationship dissolution in particular (Monroe et al., 1999), predict the onset of major depressive episodes. Furthermore, non-marital relationship dissolution is an increasing phenomenon in North America, as individuals tend to marry later in life (Statistics Canada, 2011; World Bank Cross Country Data, 2015).

Highly stressful events and trauma may also produce positive changes such as posttraumatic growth (Calhoun & Tedeschi, 2004; Lindstrom, Cann, Calhoun, Tedeschi, 2013; Taku, Cann, Tedeschi, & Calhoun, 2009), which refers to a significant positive change arising from a struggle with a major life crisis (Calhoun, Cann, Tedeschi, & McMillan, 2000). Posttraumatic growth may be reflected in different domains of life, including having a greater appreciation for life, warmer and more intimate relationships, and spiritual development (Tedeschi & Calhoun, 2004). Emerging research indicates that posttraumatic growth is also experienced for some after divorce (Krumrei, Mahoney, & Pargament, 2009) and non-marital

dissolution (Tashiro & Frazier, 2003) (hereafter post-dissolution growth). Which factors best determine the extent of post-dissolution distress versus growth that occur after experiencing a stressful relationship breakup?

Two cognitive processing styles that may determine these outcomes are deliberate and intrusive repetitive thinking specific to the event (Cann et al., 2011; Tedeschi & Calhoun, 2009; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012). Deliberate repetitive thinking is a purposeful processing oriented to the understanding of the event and its implications (Cann et al., 2011), whereas intrusive repetitive thinking refers to experiencing unwanted recurrent thoughts of the stressful event. One key difference between these processing styles is the amount of personal control the individual perceives him- or herself to have over his or her thoughts. Cross-sectional studies investigating adjustment following stressful events indicate that event-related intrusive repetitive thinking is more strongly associated with various measures of posttraumatic distress, whereas event-related deliberate thinking is more strongly related to posttraumatic growth (e.g., Cann et al., 2011; Taku, et al., 2009). Although the two styles of processing appear to contribute either to distress or growth, there also is evidence to indicate they are positively correlated. Various researchers (Calhoun, Cann, Tedeschi, & McMillan, 2009; Lindstrom, et al., 2013) have suggested that intrusive thoughts soon after a stressful event may result in more deliberate thinking, which in turn could lead to increased posttraumatic growth. That is, there might be an unintended positive effect of intrusive thoughts by causing more thought about the stressful event, which primes more deliberate thinking about the positive aspects of such event. Although these contentions have been supported in retrospective studies (e.g., Lindstrom et al., 2013), no studies have tested them prospectively.

Similar to the distinction for event-related processing styles, different styles of repetitive

thinking may be found among trait-like forms of rumination (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Schoofs, Hermans, & Raes, 2010; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Specifically, brooding, a dimension of rumination consisting of a tendency for judgmental negative repetitive thinking, has been identified as a maladaptive cognitive style (Aldao et al., 2010; Treynor, et al., 2003). In contrast, reflection, a more analytical and problem-solving oriented style, may be more neutral in the short-term and even positive in the long term by predicting lower depressive symptoms in non-clinical populations (Safrey & Ehrenberg, 2007; Treynor et al., 2003). Although conceptually related, trait-like and event-specific repetitive thinking are only moderately correlated ($r = .20$, Cann et al., 2011). Overall, models of cognitive processing, whether event-related or trait-like, underscore the differential impact that various cognitive processing styles may have in the aftermath of highly stressful life events and psychological well-being more broadly (Cann et al., 2011; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013).

In the context of non-marital relationship dissolution, few published studies have examined the role of cognitive variables in relation to positive and negative outcomes after relationship dissolution (Brenner & Vogel, 2015; Cupach, Spitzberg, Bolingbroke, & Tellitocci, 2011). For instance, having negative thoughts of the ex-partner (e.g., "I think about all the things that bothered me about x") predicts both positive emotions and higher dissolution distress (Brenner & Vogel, 2015); and higher rumination over the relationship is related to undesired pursuit behaviours (Cupach et al., 2011). In regards to post-dissolution growth, most studies have not examined the role of dissolution-specific cognitive processing. For instance, Tashiro and Frazier (2003) found that women and individuals who attributed the breakup to environmental factors (e.g., work stress) reported greater post-dissolution growth. Another study found that

greater post-dissolution growth was associated with less psychiatric comorbidity after relationship dissolution, but there was no insight into how greater post-dissolution growth was attained (Studley & Chung, 2015).

In our search, we only found one published study that has made a distinction between trait-like and dissolution-specific cognitive processing and breakup adjustment (Safrey & Ehrenberg, 2007). In this retrospective study both greater trait-like and dissolution-specific brooding were related to greater negative affect toward the ex-partner and the overall relationship (e.g., feeling hurt, lonely). Trait-like reflection predicted positive adjustment after a break-up (e.g., feeling relieved) and had a negative correlation to negative affect. In Safrey and Ehrenberg's (2007) study, however, the main outcome variable was the valence of emotions experienced several months following the breakup as opposed to distress symptoms and/or growth. Moreover, intrusive and deliberate dissolution-specific processing styles were not investigated as predictors of psychological adjustment. Overall, none of these studies has dissected the roles of trait-like and dissolution-specific cognitive processing in relation to adjustment post-dissolution.

Current Study

Our primary research question revolved around the relative contribution of trait-like and dissolution-specific cognitive processing styles in the prediction of post-dissolution distress and post-dissolution growth. Three hypotheses were formulated based on both trait-like and event-related cognitive literature. First, we expected that greater brooding and dissolution-specific intrusive thinking would be related to greater post-dissolution distress, but unrelated to post-dissolution growth. Conversely, the second hypothesis was that greater reflection and dissolution-specific deliberate thinking would be uniquely related to higher post-dissolution growth. Third,

based on Cann and colleagues' work (2011), we expected that greater dissolution-specific intrusive thinking at an earlier point in time would prospectively predict higher dissolution-specific deliberate thinking. To this end, young adults who experienced a recent dissolution of a non-marital relationship completed a battery of questionnaires assessing post-dissolution distress, post-dissolution growth, and trait-like and dissolution-specific cognitive processing within four months of the breakup (T1). A sub-sample of participants completed a seven-month follow-up (T2) to test the prospective relationship between T1 dissolution intrusions and T2 dissolution deliberate thoughts. Additional analyses were conducted to explore the overall relationship between T1 cognitive processing and T2 post-dissolution distress and post-dissolution growth.

Method

Participants

The sample consisted of 148 students from different universities in Eastern Canada who experienced a non-marital relationship breakup in the preceding four months. The mean age was 20 years ($SD = 3.4$) and 78% ($n = 116$) were women. Given that the study focused on non-marital relationships, individuals who reported marital separation or divorce were not eligible to participate. Prior to dissolution, the relationships ranged in duration from 1.5 months to 6 years ($M = 1.3$ years, $SD = 1.5$ years). Time since dissolution at T1 ranged from one week to four months ($M = 7.0$ weeks; $SD = 4.2$ weeks). Eleven participants (7%) were in same-sex relationships. Sixty-six participants indicated that they had initiated the breakup (*initiator*, 44.6%), 58 reported that the ex-partner was the initiator (*non-initiator*, 39.2%), and 24 reported a mutual breakup (16.2%). At T1, 31 participants (20.9%) were in new relationships.

Materials

Relationship and dissolution characteristics survey. The following single-items questions

were formulated to obtain demographic and relationship-related information. We assessed relationship duration (“*How long did your relationship last?*” (months), time since dissolution (“*How long has it been since the breakup?*” (weeks), initiator status (“*Who initiated the breakup?*” (me, my ex-partner, mutual), desire for breakup (“*How strongly did you want the breakup to happen regardless of who initiated the breakup?*” from 0 = *I did not want the breakup at all* to 10 = *I absolutely wanted the breakup to happen*), and relationship status (“*Are you currently in a new relationship?*” no/yes).

Response Styles Questionnaire – Rumination Scale (RRS; Nolen-Hoeksema & Morrow, 1991). The 22-item RRS was originally developed to assess the frequency of ruminative thoughts in terms of cognitions about current sadness as well as the causes and consequences of sad mood. The items are answered on a 4-point Likert scale ranging from 1 = *almost never* to 4 = *almost always*. Factor analytic studies indicate that the RRS-Rumination yield two factors referred to as Brooding (e.g., *I think “What am I doing to deserve this?”*) and Reflection (e.g., *Go someplace alone to think about your feelings*) (Schoofs, et al., 2010). In the present study, the internal consistency coefficients were $\alpha = .87$ and $.90$ for RRS-Brooding and RRS-Reflection, respectively.

Event-Related Rumination Inventory (ERRI; Cann et al., 2011). The ERRI is a 20-item inventory composed of two subscales that assess event-related repetitive thinking. Ten items compose the event-specific intrusive thoughts subscale (ERRI-Intrusive; *I thought about the event when I did not mean to*), and the remaining ten items constitute the event-specific deliberate thoughts subscale (ERRI-Deliberate; *I deliberately thought about how the event had affected me*). The response options are rated on a four-point scale ranging from 0 = *not at all* to 3 = *often*. The inventory has good convergent and divergent validity properties (Cann et al., 2011). The

instructions were modified slightly to indicate that the items referred only to the breakup. In the current study, the internal consistency of T1 and T2 ERRI-Intrusive were $\alpha = .94$ and $.96$, respectively, and $\alpha = .86$ and $\alpha = .93$, for T1 and T2 ERRI-Deliberate, respectively.

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). This 21-item measure assesses positive outcomes experienced by individuals who were exposed to a highly stressful or traumatic event. The items are assessed on a six-point scale ranging from 0 = *I did not experience this change* to 5 = *I experienced this change to a very great degree*. The total score was employed for the analyses as it is a more reliable measure than the subscales (Tedeschi & Calhoun, 1996). The PTGI instructions were adjusted slightly to assess posttraumatic growth in relation to the breakup specifically (i.e., post-dissolution growth) (see also Tashiro & Frazier, 2003). The internal consistency for the PTGI was $\alpha = .93$ at T1, and $\alpha = .95$ at T2.

The Breakup Distress Scale (BDS; Field et al., 2009; 2010) is a 16-item questionnaire adapted from the Inventory of Complicated Grief (ICG; Prigerson et al., 1995) to assess distress experienced after romantic relationship dissolution such as feeling bitter and empty since the breakup (Field, et al., 2009). Responses are given on a Likert scale ranging from 1 (*not at all*) to 4 (*very much so*). For the purpose of hypothesis testing, one of the items (Item 1 = *I think about this person so much that it's hard for me to do things I normally do*) was removed because of content overlap with the ERRI-Intrusive. Thus, a 15-item BDS score was employed for the main analyses. The internal consistency for the BDS was $\alpha = .93$ at T1, and $\alpha = .96$ at T2.

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a self-report questionnaire with well-established validity in the assessment of behaviours, attitudes, and feelings that characterize depression (Beck, Steer, & Garbin, 1988). Each of the 21 symptom items has four corresponding response options that reflect increasing symptom frequency or

severity. The internal consistency of the instrument in the current sample was $\alpha = .95$ at T1, and $\alpha = .96$ at T2.

Procedure

Participants were invited to take part in a multi-stage investigation on how young adults deal with relationship dissolution. Participation in each portion of the study was voluntary. In the initial lab session (T1; $M = 7.0$ weeks; $SD = 4.2$ weeks after the breakup), participants completed the battery of questionnaires outlined above as well as a memory task not relevant to the current study. (The findings from another part of the project may be found in Blind). In a second stage, participants were invited via email to complete an online follow-up, which took place three to nine months after T1 ($M = 6.76$ months, $SD = 3.47$). The mean duration from dissolution to T2 was 8.5 months. Follow-up questionnaires were completed online via a secure website. Additional questions at T2 asked whether participants had reunited with the previous partner and what they considered were the positive and negative consequences of their breakup. Participants received an online debriefing form and educational feedback, and were compensated with either course credit or a \$10 gift card.

Results

Data Analysis Strategy

A series of multiple hierarchical regressions analyses was conducted to test the main hypotheses. Separate regression analyses were conducted to predict T1 post-dissolution distress as assessed by the BDS, and T1 post-dissolution growth assessed by the PTGI. For both outcome variables, depressive symptoms, as assessed by the BDI-II, were controlled in the first step. Gender and age were entered in Step 2, followed by trait-like cognitive styles in Step 3. These variables were entered first as they were antecedent to the event (i.e., relationship dissolution).

Relationship and breakup variables (e.g., time since dissolution, initiator status, event-related cognitive processing) and dissolution-specific cognitive processing were entered in the fourth and fifth steps, respectively, to examine their additional contribution beyond pre-existing variables (e.g., gender, trait-like brooding). Similar analyses were conducted for both T2 post-dissolution distress and T2 post-dissolution growth. Supplementary analyses¹ indicated that relationship variables did not predict T2 post-dissolution growth or distress prospectively. Therefore, for T2 analyses only predictor variables specific to the hypotheses (i.e., processing style) were included in these regression analyses. Additional exploratory analyses were conducted.

Descriptive Statistics

Table 1 presents the means, standard deviations (*SDs*), and correlations of the key variables at T1. Following previous studies (Tashiro & Frazier, 2003), initiator status was re-categorized as *Non-initiators (1)* (39.2%, $n = 58$) and *Initiator/Mutual breakup (2)* (60.8%, $n = 90$). The BDI-II ($M = 16.80$, $SD = 12.77$) was significantly higher than that found in regular student samples in Canada (Steer & Clark, 1997), and placed the sample within the mild range of depressive symptoms (Beck et al., 1996). The BDS scores in the current sample were higher than those found in other non-marital relationship dissolution studies (Field et al., 2009), and had a strong correlation with BDI-II symptoms ($r = .78$). PTGI scores in the current sample were comparable (Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012) or higher (Groleau, Calhoun, Cann, & Tedeschi, 2013) than those reported after traumatic events.

Prediction of T1 Post-Dissolution Distress

The model predicting T1 post-dissolution distress (T1 BDS scores) was significant and explained 77% of the total variance, $F(12, 130) = 36.72$, $R = .88$, $p < .001$ (see Table 2). Except for Step 2 (gender and age), all other steps were significant. In Step 3, higher brooding predicted

higher T1 post-dissolution distress as expected. In Step 4, longer relationships and lower desire for the breakup were uniquely associated with higher T1 post-dissolution distress. As expected, in the last step, higher dissolution intrusive thinking explained additional variance of T1 post-dissolution distress. This finding is remarkable given the large portion of the variance explained by the BDI-II. The time since the dissolution, current relationship status, initiator status, reflection, and deliberate dissolution processing were non-significant unique predictors. Of importance, this analysis showed that cognitive processing (brooding and dissolution intrusive thoughts) showed specificity in predicting distress caused by the termination of the relationship specifically as opposed to more general distress as assessed by the BDI-II.

Prediction of T1 Post-Dissolution Growth

The model predicted 24% of T1 post-dissolution growth variance as assessed by the T1 PTGI, $F(12, 132) = 3.56, p < .001$. The variables entered were the same as in the distress model. Steps 1, 2, and 4 were not significant (See Table 2). Thus, neither depressive symptoms, gender, age, nor any of the dissolution variables (e.g., time since dissolution, having a new relationship) were predictors of T1 post-dissolution growth. Contrary to our expectation, reflection did not predict T1 post-dissolution growth. Unexpectedly, greater brooding was related to greater T1 post-dissolution growth. However, in support of our second hypothesis, greater dissolution-specific deliberate thoughts were uniquely related to higher T1 post-dissolution growth. Although greater brooding predicted higher T1 post-dissolution growth, the relationship between deliberate thoughts and post-dissolution growth was stronger than the relationship between brooding and post-dissolution growth (as indicated by a larger squared semipartial correlation, an index of unique variance explained by individual predictors). This finding suggests that in the case of post-dissolution growth, deliberate processing of the breakup was the most important predictor.

Prospective Analyses

Completion rate. Sixty-five participants (44% out of 148) completed the online follow-up assessment. A series of independent *t*-tests between the follow-up completers and not completers on T1 variables showed that these groups of participants did not differ significantly on any relevant variables including age, gender, depressive symptoms, post-dissolution distress, post-dissolution growth, and cognitive processing styles (all *ps* > .12).

Prediction of T2 post-dissolution distress. An exploratory multiple hierarchical regression was conducted to predict T2 post-dissolution distress (T2 BDS scores) from T1 cognitive processing. T1 post-dissolution distress (T1 BDS scores) was controlled in Step 1. Step 2 consisted of brooding and reflection. T1 dissolution-specific intrusive and deliberate thoughts were entered on Step 3. The model significantly predicted 73% of the variance, $F(5, 57) = 30.86$, $R = .85$, $p < .001$. Steps one (T1 BDS) and two, were significant (See Table 3). In Step 2 lower reflection and higher brooding prospectively predicted T2 distress. Step 3 was not significant. Thus, trait-like cognitive style, but not dissolution-specific processing predicted post-dissolution distress prospectively.

T2 dissolution-specific deliberate thoughts. Our third hypothesis was that higher T1 dissolution intrusive thoughts would prospectively predict higher T2 dissolution deliberate thoughts. A hierarchical multiple regression was conducted with T2 deliberate dissolution thoughts (T2 ERRI-Deliberate) as the criterion, and T1 deliberate dissolution thoughts (T1 ERRI-Deliberate) in Step 1 as the covariate. Trait-like brooding and reflection were entered in Step 2. T1 intrusive thoughts were entered in Step 3. The model significantly predicted 35% of the variance, $F(4, 60) = 8.08$, $R = .59$, $p < .001$. Steps one, $\Delta R^2 = .17$, $p = .001$, two, $\Delta R^2 = .09$, $p = .031$, and three, $\Delta R^2 = .09$, $p = .005$, were all significant. Higher brooding predicted higher T2

deliberate thoughts, $\beta = 0.35$, $p = .017$, and in support for our hypothesis, higher T1 dissolution intrusive thoughts predicted higher T2 deliberate thoughts, $\beta = 0.39$, $p = .005$.

Prediction of T2 post-dissolution growth and moderating effects. Given the relationship between T1 dissolution intrusive thoughts and T2 deliberate thoughts, an exploratory analysis was conducted in which the interaction between T1 dissolution intrusive thoughts and T2 deliberate thoughts was tested as a potential predictor of T2 post-dissolution growth (T2 PTGI scores). In Step 1, T1 post-dissolution growth was controlled. Step 2 consisted of brooding and reflection, Step 3 of T1 dissolution intrusive thoughts and T2 deliberate thoughts. Step 4 consisted of the T1 intrusive thoughts X T2 deliberate thoughts interaction (all scores were centered). The model significantly predicted 49.5% of T2 post-dissolution growth variance, $F(6, 58) = 9.46$, $p < .001$ (See Table 4). After controlling for T1 post-dissolution growth, Step 2 (brooding and reflection) was not significant. Step 3 was significant, with higher T2 deliberate thinking predicting higher T2 post-dissolution growth. Whereas T1 intrusive thinking was not significant, the interaction was significant, thus indicating that T1 intrusive thinking moderated the relationship between T2 deliberate thinking and T2 post-dissolution growth.

The interaction was followed up by creating Low (1 *SD* below the mean) and High (1 *SD* above the mean) T1 dissolution-specific intrusive-thinking groups (Figure 1). Then, T2 deliberate thinking slopes for the Low and High T1 intrusive thinking were estimated (Louis, 2009). The slope in the Low intrusive thinking group was, $B = 1.11$, $\beta = 0.35$, $p = .008$. The slope in the High intrusive thinking group was steeper, $B = 2.74$, $\beta = 0.87$, $p < .001$. Therefore, higher dissolution-specific intrusive thoughts at an earlier stage after the dissolution (T1), together with higher dissolution deliberate thoughts eight months after (T2), resulted in greater “long-term” post-dissolution growth (T2 PTGI scores). However, those who experienced lower dissolution

intrusive thoughts at T1 required relatively greater deliberate thinking to attain greater post-dissolution growth relative to the individuals who initially experienced greater dissolution intrusive thoughts.

Discussion

Distress symptoms after the dissolution of non-marital relationship may be as high as those experienced after other traumatic events (Gold et al., 2005). However, some individuals also experience post-dissolution growth after such an event (Tashiro & Frazier, 2003). In the current study, various cognitive styles in which individuals process the relationship dissolution differentially predicted concurrent and prospective levels of post-dissolution distress and post-dissolution growth.

Consistent with other studies, a tendency to ruminate (i.e., brooding), being involved in a longer relationship, and not desiring the breakup were predictive of greater concurrent post-dissolution distress (Brenner & Vogel, 2015; Safrey & Ehrenberg, 2007; Tashiro & Frazier, 2003). Expanding on such findings, a unique relationship between higher dissolution-specific intrusive thinking and elevated post-dissolution distress was found. Furthermore, the relationship between dissolution-specific intrusions and post-dissolution distress held significant after controlling for depressive symptoms, suggesting that dissolution-related intrusions had a specific relationship to post-dissolution distress irrespective of more general distress (i.e., depressive symptoms). Although to our knowledge other studies have not examined these cognitive constructs in the context of relationship dissolution, the unique relationship between dissolution-specific intrusive thinking and post-dissolution distress is consistent with studies in which event-specific intrusive thinking predicted higher posttraumatic stress symptoms after a traumatic event (e.g., death of a loved one, being the victim of assault; Cann et al., 2011; Lindstrom et al., 2011).

A different picture emerged from the longitudinal analyses in which greater brooding and lower reflection were associated with greater prospective post-dissolution distress. These findings are in line with Treynor's et al. (2003) findings of a positive correlation between brooding and depressive symptoms, and a negative correlation between reflection and depressive symptom over time. However, dissolution-specific cognitive processing did not prospectively predict post-dissolution distress. These findings suggest that, event-specific intrusive processing may have a limited role in predicting sustained distress. In turn, more stable individual variables (e.g., brooding) may be more prominent in the prediction of long-term negative psychological outcomes after an event such as relationship dissolution. Indeed, past studies have found that a tendency to ruminate prospectively predicted increased depressive symptoms after negative life events (e.g., Michl et al., 2013). Therefore, individuals with a higher tendency for brooding may be particularly vulnerable to experience higher distress related to the relationship dissolution.

In contrast to the post-dissolution distress findings, only higher brooding and higher dissolution-specific deliberate thinking emerged as predictors of greater concurrent post-dissolution growth. The contribution of dissolution-specific deliberate thinking was higher than that of brooding. Unlike post-dissolution distress level, post-dissolution growth was not influenced by situational factors (e.g., initiator status, relationship duration), indicating that cognitive processing played a more important role than situational factors for a positive gain to occur following a breakup.

The relationship between brooding and post-dissolution growth was unexpected as brooding is generally associated with negative psychological outcomes (e.g., Aldao et al., 2010). We speculate that individuals with greater tendency for brooding may be also more prone to initiate deliberate thinking about the relationship dissolution in specific. Relatedly, the finding

that deliberate thoughts of the relationship were also predictive of post-dissolution growth indicates that the more controllable aspect of repetitive thinking in general may be a contributor for greater post-dissolution growth. We did not find any published studies on relationship dissolution investigating the role of deliberate thinking of the relationship and post-dissolution growth. Nonetheless, current findings are in accord with studies investigating stressful and traumatic events, in which event-specific deliberate thinking predicted posttraumatic growth (Stockton, Hunt, & Joseph, 2011; Taku, et al., 2009), extending previous findings to the context of relationship dissolution.

Regarding prospective post-dissolution growth, a key finding of the current study was that earlier levels of intrusive thinking interacted with higher prospective deliberate thinking to predict higher post-dissolution growth. In this interaction, those who experienced early high intrusive processing needed to engage in relatively lesser deliberate processing to attain similar post-dissolution growth compared to those who experienced lower intrusiveness early on. Cann et al. (2011) found that while intrusive thoughts of a stressful event indexed distress after a stressful life event, such thoughts also correlated with higher deliberate thinking in a retrospective study. We replicated here those findings longitudinally in the context of relationship dissolution, as higher initial dissolution intrusive thinking predicted higher prospective deliberate thinking. A potential explanation of this interaction is that high levels of earlier intrusive processing may buffer the amount of deliberate processing needed to gain growth out of the relationship dissolution. Thus, there might be a paradoxical positive benefit of intrusive thinking when they lead to deliberate thinking as well. Alternatively, the interaction between intrusive and deliberate thoughts may indicate that thinking of the breakup is adaptive in the long term regardless of the processing style.

Overall, the current findings regarding post-dissolution growth suggest that initiating the cognitive processing of the breakup was fruitful for the individuals in both the short and longer terms as individuals reported greater gains from this event as they engaged in greater deliberate thinking. That is, purposefully trying to make sense of the relationship dissolution was the most important ingredient for attaining positive changes in one's life. Interestingly, both brooding and intrusive dissolution thoughts played a (indirect) positive role in predicting greater post-dissolution growth. Despite these exciting findings, more longitudinal studies are necessary to confirm the current result pattern.

A critical variable in determining the psychological outcomes of the dissolution was the dissolution-specific processing style. Only the processing style of relationship-specific thoughts had a differential predicting pattern for each outcome (distress and growth), for which intrusive thoughts were detrimental and deliberate thoughts were beneficial (as opposed to brooding, which predicted both outcomes). An important future direction in the relationship-dissolution context would be to investigate why the perceived uncontrollability or involuntariness of the relationship thoughts was problematic for adjustment. These findings resemble the negative impact that intrusive memories and thoughts have on the severity of posttraumatic stress, obsessive-compulsive, and depressive symptoms (Clark & del Palacio-Gonzalez, 2014; Starr & Moulds, 2006). Intrusive thoughts are almost universal, and may be more prominent after stressful events (Tedeschi & Calhoun, 2004). However, how individuals appraise such intrusions greatly contribute to the severity of various symptoms (Clark & del Palacio-Gonzalez, 2014; Starr & Moulds, 2006). Thus, whether (negative) appraisals of dissolution intrusions (e.g., "I continue to think about my ex, therefore I must be obsessed") have an impact on post-dissolution distress severity should be addressed in future research.

More research investigating how to attain positive adjustment after relationship dissolution is also needed. The small variance explained in post-dissolution growth (24%) suggests that there are important pieces missing that could inform cognitive models and interventions targeting positive adjustment post-dissolution. In this regard, a variable that may be particularly relevant to examine is the centrality that the dissolution had for the individual's identity (Boals, 2014; Groleau et al., 2013).

Some of the limitations of the current study include the reliance on self-report measures and a relatively high attrition rate for the follow-up. Future investigations should re-examine our prospective findings with a larger sample. In addition, we assessed the style of cognitively processing the event, but not the valence (positive vs. negative) or actual content of the thoughts. Assessing the content of the dissolution-related thoughts could inform psychological interventions for young adults dealing with a distressing relationship breakup.

The current investigation provided new insights into the lingering effects of relationship breakup, a highly stressful event. First, the study elucidates the role that both trait-like and dissolution-specific cognitive styles have in determining post-dissolution distress and post-dissolution growth. Second, to our knowledge this is the first study that employed a longitudinal design in which dissolution-specific cognitive processing was investigated in relation to prospective post-dissolution distress and post-dissolution growth. Dissolution-intrusive thinking was associated with higher distress soon after the dissolution. In contrast, deliberate thoughts about the breakup were only associated with concurrent post-dissolution growth and interacted with intrusive thoughts to predict prospective growth. Brooding had a non-specific association with both distress and growth. In the case of post-dissolution growth this relationship was only found for concurrent growth, whereas for post-dissolution distress, the relationship was found for

both concurrent and prospective distress severity. Reflection had a positive effect in individuals' adjustment in the long-term by predicting lower distress.

Stressful life events including relationship breakup appear to lead to increased cognitive processing, both intrusive and deliberate, because of the need to accommodate the negative experience to preexisting beliefs (Calhoun & Tedeschi, 2004; Tedeschi & Calhoun, 2004). Of particular note, as suggested by current findings, maladaptive forms of repetitive thinking (e.g., brooding, intrusions), may lead to positive outcomes if they also provoke a more deliberate attempt to understand the breakup. Ending a relationship may challenge the veracity of important beliefs about ourselves, the other person, and relationships more broadly, but they can be opportunities for growth and not only a rite of passage that must be endured.

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Footnotes

¹ Two regression analyses containing relationship variables as predictors of prospective BDS and PTGI were conducted. Although the models were significant, this was only due to the covariate entered in Step 1 (T1 BDS and T1 PTGI, respectively). Step 2 containing time since breakup, duration of the relationship, current relationship status, initiator status, and desire for breakup was non-significant in both the BDS, $\Delta R^2 = .02$, $p = .676$, and the PTGI, $\Delta R^2 = .07$, $p = .330$, models. Therefore relationship/breakup variables were non-significant predictors in the prospective analyses for T2 BDS and T2 PTGI. Furthermore, in light of our reduced sample size, the T2 analyses were conducted only employing the cognitive processing variables central for hypothesis testing.

Table 1
Mean, SDs, and Correlations for Primary Variables

	Measure	2	3	4	5	6	7	8	9	10	11	12	13	<i>M (SD)</i>
1	T1 BDS	-.07	-.07	.22**	-.41**	.44**	.65**	.43**	.75**	.74**	-.03	.51**	.66**	30.91 (10.90)
2	T1 PTGI		-.01	.16*	-.04	.02	.08	.24**	.03	-.11	.53**	.20	.03	53.74 (22.24)
3	Time since Breakup			-.02	.04	-.10	-.07	-.06	-.09	.04	.07	-.03	-.06	7.32 (4.28)
4	Relationship Duration				-.01	.03	.23**	.13	.06	.05	.04	-.02	-.08	16.65 (12.57)
5	Desire for Breakup					-.17*	-.17*	-.17*	-.42**	-.26*	-.25*	-.25*	-.31*	5.03 (3.36)
6	RRS-Reflection						.55**	.52**	.43**	.30*	-.03	.32*	.29*	10.84 (4.13)
7	RRS-Brooding							.46**	.60**	.56**	-.14	.45**	.50**	12.36 (3.94)
8	T1 ERRI-Deliberate								.47**	.24	.23	.41**	.25*	15.69 (6.73)
9	T1 ERRI-Intrusive									.58**	-.03	.55**	.64**	17.55 (8.44)
10	T2 BDS ^Y										-.07	.59**	.84**	25.12 (10.85)
11	T2 PTGI ^Y											.36**	.10	52.81 (26.31)
12	T2 ERRI-Deliberate ^Y												.78**	11.58 (8.31)
13	T2 ERRI-Intrusive ^Y												--	10.32 (9.02)

Note: *N* = 148. BDS = Breakup Distress Scale (15 items); ERRI = Event-Related Rumination Inventory; PTGI = Posttraumatic Growth Inventory; RRS = Responses Styles Questionnaire; T1 = Time 1; T2 = Time 2.

^Y*n* = 65

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

Table 2

Hierarchical Multiple Regression Predicting Concurrent Post-Dissolution Adjustment

	Post-Dissolution Distress (T1 BDS)				Post-Dissolution Growth (T1 PTGI)			
	ΔR^2	β	t	sr^2	ΔR^2	β	t	sr^2
Step 1	.62***				.02			
BDI-II		.79	15.21	.62		-.14	-1.62	.02
Step 2	.01				.02			
Gender		-.03	-0.52	<.01		-.14	-1.60	.02
Age		-.11	-2.07	.03		-.05	-0.54	<.01
Step 3	.03**				.06*			
RRS-Reflection		.05	0.80	<.01		-.05	-0.42	<.01
RRS-Brooding		.18	2.46*	.04		.34	2.62**	.05
Step 4	.06***				.06			
Time since dissolution		.01	0.12	<.01		-.14	-1.63	.02
Relationship duration		.16	3.31***	.08		.19	2.22	.04
Desire for dissolution		-.12	-2.16*	.03		-.11	-1.06	<.01
Initiator status ^Y		-.10	-1.79	.02		.07	0.63	<.01
New relationship [†]		.09	1.86	.02		-.10	-1.19	.01
Step 5	.05***				.07**			
ERRI-Deliberate		.02	0.30	<.01		.35	3.24***	.08
ERRI-Intrusive		.35	5.27***	.17		.02	0.17	<.01

Note: $N = 148$. BDI-II = Beck Depression Inventory – II; BDS = Breakup Distress Scale; ERRI = Event-Related Rumination Inventory; PTGI = Post-traumatic Growth Inventory; RRS = Responses Styles Questionnaire.

^Y1 = non-initiators, 2 = Initiators/mutual

[†] 1 = yes, 2 = no

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Hierarchical Multiple Regression Predicting Prospective

Post-Dissolution Distress

T2 Post-Dissolution Distress				
(T2 BDS)				
	ΔR^2	B	<i>t</i>	<i>sr</i> ²
Step 1 (Covariate)	.69***			
T1 BDS		.83	11.59***	.69
Step 2	.04*			
RRS-Reflection		-.24	-2.71**	.11
RRS-Brooding		.20	2.03*	.06
Step 3	<.01			
T1 ERRI-Deliberate		-.05	-0.60	<.01
T1 ERRI-Intrusive		.08	-0.73	<.01

Note: *n* = 65. BDS = Breakup Distress Scale;

ERRI = Event-Related Rumination Inventory; RRS = Responses
Styles Questionnaire.

p* < .05. *p* < .01. ****p* < .001.

Table 4

Hierarchical Multiple Regression Predicting Prospective Post-Dissolution Growth

T2 Post-Dissolution Growth				
	(T2 PTGI)			
	ΔR^2	β	t	sr^2
Step 1 (Covariate)	.28***			
T1 PTGI		.53	4.97***	.28
Step 2	.02			
RRS-Reflection		.10	0.73	<.01
RRS-Brooding		-.18	-1.32	.03
Step 3	.14***			
T1 ERRI-Intrusive		-.17	-1.25	.02
T2 ERRI-Deliberate		.47	3.83***	.20
Step 4 (Interaction)	.05**			
T1 ERRI-Int. * T2 ERRI-Del.		-.26	-2.48**	.10

Note: $n = 65$. ERRI = Event-Related Rumination Inventory; PTGI = Posttraumatic Growth Inventory; RRS = Responses Styles Questionnaire.

* $p < .05$. ** $p < .01$. *** $p \leq .001$.

Figure Caption

Figure 1. Interaction between T1 dissolution-specific intrusive thoughts (T1 ERRI-Intrusive) and T2 dissolution-specific deliberate thoughts (T2 ERRI-Deliberate) in the prediction of T2 post-dissolution growth (T2 PTGI).