Psychological Trauma: Theory, Research, Practice, and Policy
2013, Vol. 5, No. 5, 477–483

1942-9681/13/$12.00 http://dx.doi.org/10.1037/a0028809

The Role of Centrality of Events in Posttraumatic Distress and Posttraumatic Growth

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Disruptions to core beliefs, rumination, and finding meaning have been associated with the development of posttraumatic distress (Janoff–Bulman, 1992, 2006). These variables have also contributed to the development of posttraumatic growth, which is the experience of a positive life change as the result of a traumatic experience (Tedeschi & Calhoun, 1996). A new variable, centrality of event, has recently been implicated in both processes (Boals & Schuettler, 2011), although it remains unclear if centrality of event is a unique contributor to posttraumatic outcomes beyond the influence of other variables known to do so. The present study examined the unique contribution of centrality of event to the development of both posttraumatic distress and posttraumatic growth. Centrality of event was a unique predictor of both variables. This seemingly paradoxical finding underscores the need for further research in this area, particularly concerning the perceived valence of a major event that may be interpreted as central. Clinicians may usefully attend to centrality when working with individuals who have experienced a potentially traumatic event.

Keywords: trauma, posttraumatic growth, centrality of event

It has recently been suggested that the centrality of a traumatic event, that is, "the degree to which an individual believes a negative event has become a core part of their identity," may be an important contributor to posttraumatic distress (Boals, 2010, p. 107). When an event becomes central, it may be used as a reference point for everyday events. Central events may also be viewed as a turning point in one's life story and become a core component of one's personal identity (Berntsen & Rubin, 2006). Centrality of event, then, refers to the degree to which people exposed to traumatic events think of themselves in part, or perhaps exclusively, as someone who has experienced a traumatic event.

Previous research has shown that event centrality is associated with negative mental health consequences, particularly symptoms of posttraumatic distress. For example, in a sample of 247 Danish college undergraduates, Berntsen and Rubin (2006) found that higher levels of centrality were positively correlated with depression and with the severity of posttraumatic stress disorder (PTSD) symptoms. Similarly, individuals whose symptoms met criteria for PTSD reported higher levels of centrality for traumatic events than those who whose symptoms did not meet criteria for a diagnosis (Berntsen & Rubin, 2007). Although previous studies of centrality have shown that it is associated with symptoms of posttraumatic distress, they did not control for variables already known to be related to distress.

This article was published Online First August 13, 2012.

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A number of other factors have been shown to be associated with distress following a traumatic event, including threats to core beliefs and the presence of intrusive ruminations about the event. Individuals hold a basic set of beliefs about themselves and the external world referred to as the assumptive world (Janoff–Bulman, 1992, 2006; Murray Parkes, 1971). The experience of a traumatic event significantly challenges elements of the assumptive world. Greater levels of threat to core beliefs have been found to be associated with higher levels of posttraumatic stress (Cann et al., 2010). Although challenge to core beliefs is expected to be correlated with centrality of event the two are distinct concepts. Core beliefs challenge represents the degree to which major components of one's understanding of the world (Janoff–Bulman, 1992) are called into question by the event. Centrality of event, on the other hand, refers to the degree to which one's life story is subsequently defined by the trauma experience. As such, significant challenge to core beliefs would be expected to be related to centrality.

Another factor that has been found to be associated with broader symptoms of posttraumatic distress is intrusive rumination, or unwanted repeated thinking about the traumatic event. These types of thoughts, that come to mind when an individual is not actively trying to think about the event, may have particularly negative consequences. For example, in a sample of participants who had experienced physical or sexual assault, Michael, Halligan, Clark, and Ehlers (2007) found that those whose symptoms met diagnostic criteria for PTSD were more likely to engage in rumination than those whose symptoms did not meet the diagnostic criteria. Moreover, rumination was also associated with broader PTSD symptom severity (Michael et al., 2007).

In addition to the negative psychological consequences of trauma, however, some individuals report positive life changes as the result of the struggle with the event. These positive experi-

ences, known as posttraumatic growth (PTG), reflect the experience of positive change as a result of having to cope with a major life stressor (Calhoun & Tedeschi, 1999). PTG tends to be reported in five major domains: improved interpersonal relationships, a greater sense of personal strength, new opportunities, greater appreciation for life, and spiritual growth (Morris, Shakespeare–Finch, Rieck, & Newbery, 2005; Taku, Cann, Calhoun, & Tedeschi, 2008; Tedeschi & Calhoun, 1996).

Previous research has identified several factors that are associated with the development of self reported PTG. In addition to contributing to posttraumatic distress, the extent to which one's core beliefs are challenged as a result of the event has also been shown to be associated with PTG. In two samples of college undergraduates and another sample of leukemia patients, for example, those who experienced a higher level of challenge to core beliefs tended to report higher levels of PTG (Cann et al., 2010).

Just as rumination has been found to be associated with posttraumatic distress, it is also assumed to be an important precursor to posttraumatic growth (Calhoun & Tedeschi, 1999). However, a distinction must be made between two types of rumination: intrusive and deliberate. Intrusive rumination, as indicated previously, refers to unwanted thoughts that come to mind when an individual is not trying to think about the event. Deliberate rumination, on the other hand, is an intentional attempt to think about the event and it is this type of rumination that is related to growth. Deliberate rumination is associated with higher levels of self-reported posttraumatic growth (Cann et al., 2011; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2011). One possible explanation for the contribution of deliberate rumination to PTG is finding meaning. In the aftermath of a traumatic event, many individuals search for meaning in their experience. Those who engage in purposeful cognitive processing of the event may be more likely to find the meaning that helps rebuild or reaffirm the challenged assumptive world. In a sample of 172 cancer patients, for example, the presence of meaning in life was shown to be positively correlated with growth (Park, Edmondson, Fenster, & Blank, 2008).

As previously noted, highly stressful events that assume a central place in the individual's life story have been shown to contribute to posttraumatic distress (Berntsen & Rubin, 2006; Berntsen & Rubin, 2007). Paradoxically, this same prediction also been made about posttraumatic growth (Tedeschi & Calhoun, 1995). Some persons who experience significant growth tend to see the struggle with the event as a major component of the life narrative, suggesting that centrality can play a role in the process of PTG. With one exception, this assumption does not appear to have been empirically tested.

In a sample of 929 college undergraduates, Boals and Schuettler (2011) found centrality of event to be a significant predictor of PTG. The study controlled for five variables, including cognitive restructuring, denial, and regret. However, there was no control for challenge to core beliefs, rumination, or found meaning which, as noted above, have been previously shown to make significant contributions to PTG. Boals, Steward, and Schuettler (2010) suggest that future research on centrality of event and PTG should specifically assess challenge to core beliefs. Therefore, one purpose of this study was to assess the degree to which centrality of event has explanatory value in predicting posttraumatic distress above and beyond other known predictor variables, such as threat to the assumptive world, posttraumatic cognitive processing, and searching for meaning. A second purpose of the present study was to empirically examine the untested assumption that centrality of event contributes to PTG, above and beyond the contribution of other variables already known to be associated with PTG. We expected that centrality of the event would contribute uniquely and significantly to both posttraumatic symptoms of distress and to posttraumatic growth, beyond variables already found to contribute to both.

Methods

Prescreening Questionnaire

To qualify for the study, participants were first required to complete a prescreening questionnaire indicating whether they had experienced at least one of 12 highly stressful or traumatic events in the past 2 years. Events included the unexpected or violent death of a close other, accident causing serious injury to self or close other, being the target of a physical or sexual assault, and deployment to a combat zone.

Participants

Undergraduate students enrolled in an introductory psychology course at a large research university in the southeastern United States were invited to participate in this study in exchange for course credit. Inventories for the study were administered via an online survey system. Potential participants were first required to complete a prescreening questionnaire. Participants who indicated that they had experienced one or more such traumas were permitted to complete the remainder of the survey.

Two-hundred 21 students originally qualified for and completed this study. Of these participants, 34 did not meet inclusion criteria and were excluded from analyses, leaving a final sample size of 187. Participants were excluded if the stressful event had occurred more than 2 years before. Participants who rated the event as less than 5 on a 7-point scale of stressfulness were also excluded. The final sample consisted of 72 men (38.5%) and 115 women (61.5%) with a mean age of 21.4 years (standard deviation [*SD*] = 4.95). The sample was ethnically diverse, consisting of 124 Caucasians (66.3%), 36 African Americans (19.3%), 10 Asian Americans (5.3%), four Latinos (2.1%), two Native Americans (1.1%), and 11 individuals who identified as "Other" (5.9%). Commonly reported traumatic events include serious medical problem of a family member or friend (65 participants, 34.8%), the unexpected or violent death of a family member or friend (51 participants, 27.3%), an accident that led to serious injury (18 participants, 9.6%), the personal experience of a very serious medical problem (16 participants, 8.6%), exposure to a threat of death (12 participants, 6.4%), being the victim of a crime (nine participants, 4.8%), being stalked (eight participants, 4.3%), being the victim of or witnessing sexual assault (five participants, 2.7%), physical abuse by an intimate partner (two participants, 1.1%), and military deployment (one participant, 0.4%).

Procedure

Participants were presented with an opportunity to participate in the study when they logged into a Research Participation web site.

Only students who indicated exposure to a stressful event on the prescreen could choose this study. Once the study was selected, participants were asked to read the informed consent statement. This statement included contact information for the university counseling center, which students were encouraged to contact should completing the survey become highly distressing. Participants who reported experiencing more than one highly stressful event were asked to focus on the most stressful event when completing the survey. The measures described below were then presented in random order for each participant to control for order effects. Participants were instructed to formulate their answers to each inventory based upon, or in reference to, the highly stressful event that had been previously identified.

Measures

Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). The Posttraumatic Growth Inventory (PTGI) is a 21-item scale which measures the extent to which individuals report positive life changes in the aftermath of a major life crisis. Items assess each of the five dimensions of PTG, but total scores are typically reported. Item ratings can range from 0 (*I did not experience this change as a result of the event*) to 5 (*I experienced this change to a very great degree as a result of the event*). The PTGI has good internal consistency (Cronbach's alpha = .90) and test–retest reliability (.71; Tedeschi & Calhoun, 1996). Internal consistency in this sample was excellent (Cronbach's alpha = .93). Scores are not correlated with social desirability (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009; Wild & Paivio, 2003) and self-reports of growth are reliably corroborated by others (Moore et al., 2011; Shakespeare–Finch & Enders, 2008).

Centrality of Event Scale (Berntsen & Rubin, 2006). The Centrality of Event Scale (CES) is a 20-item inventory designed to assess how central a major life crisis is to an individual's identity and life story. Items are measured on a scale from 1 (*totally disagree*) to 5 (*totally agree*). Examples of items on the CES include "This event has become a reference point for the way I understand new experiences" and "If this event had not happened to me, I would be a different person today." Scores are reported as a mean rating on the 5-point scale. The authors report excellent reliability (Cronbach's alpha = .94). Good reliability was replicated in the present sample (Cronbach's alpha = .89). The scale has been shown to distinguish between persons whose symptoms meet criteria for PTSD from those whose symptoms do not meet criteria (Berntsen & Rubin, 2006) and it shows the expected patterns of correlations with other scales (Berntsen, Rubin, & Siegler, 2011).

PTSD Checklist (PCL: Weathers, Litz, Herman, Huska, & Keane, 1993). This 17-item scale measures the symptoms of posttraumatic distress disorder as listed in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM–IV*; American Psychiatric Association, 2000). Participants are asked to rate on a scale of 1 to 5, with 1 indicating "not at all" to 5 indicating "extremely," the degree to which they have experienced these symptoms over the past month. A summed score is reported, ranging from 17 to 85. Weathers et al. (1993) report excellent internal consistency (Cronbach's alpha = .97) and test–retest reliability (r = .96). The reliability coefficient was excellent in this sample as well (Cronbach's alpha = .95). The scale correlates highly with clinician assessment of symptoms and it has very good diagnostic efficiency (Blanchard, Jones–Alexander, Buckley, & Forneris, 1996).

Core Beliefs Inventory (Cann et al., 2010). The Core Beliefs Inventory (CBI) is a 9-item inventory which assesses the extent to which one's assumptive world, including beliefs about oneself, others, and the world, is disrupted as the result of a highly stressful experience. Items are assessed on a scale from 0 (*not at all*) to 5 (*to a very great degree*), and include statements such as "Because of the event, I seriously examined my beliefs about my relationships with other people." Scores are reported as means on the 6-point scale. This inventory has shown good internal reliability (Cronbach's alpha = .82) and test–retest reliability (r = .69). Reliability for the present sample was excellent (Cronbach's alpha = .93). The pattern of correlations with other scales provides good evidence for the construct validity of the scale (Cann et al., 2010).

The Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006). The 10 items on the Meaning in Life Questionnaire (MiLQ) are designed to assess two dimensions of meaning. The presence of Presence of Meaning dimension (MiLQ-P) contains five items that measure the degree to which a person feels they have achieved meaning in life. The other five questions appear on the Search for Meaning dimension (MiLQ-S), which indicates the extent to which an individual is continuing to attempt understand the meaning of one's life. Ratings are made on a 7-point scale from "*Absolutely untrue*" (1) to "*Absolutely true*" (7), and scores are reported as means. The scale has good internal reliability for both subscales (MiLQ-P α = .86; MiLQ-S α = .87). Similar reliabilities were found in the current sample (MiLQ-P α = .88; MiLQ-S α = .89). In addition, the scale shows good convergent and discriminant validity (Steger et al., 2006).

Event Related Rumination Inventory (Cann et al., 2011). The Event Related Rumination Inventory (ERRI) is a 20-item inventory designed to assess repetitive thinking about a traumatic or highly stressful event. This measure contains 10 items which measure deliberate or purposeful thinking about the event, such as "I thought about whether I have learned anything as a result of my experience." The remaining 10 items assess intrusive, unintentional thoughts, including statements such as "I could not keep images or thoughts about the event from entering my mind." Ratings are made on a 4-point scale ranging from "*Not at all*" (0) to "*Often*" (3). Mean scores are reported. The authors found good internal reliability for both intrusive (Cronbach's alpha = .94) and deliberate (Cronbach's alpha = .88) items. The reliabilities for the present sample were .87 for intrusive rumination and .95 for deliberate rumination. The pattern of relationships with other measures provides good support for the construct validity of the ERRI (Cann et al., 2010).

Results

Descriptive statistics revealed an adequate amount of variability in the sample. Moreover, correlations among major variables of interest were significant and in the direction that we predicted, which replicates previous findings of the relationships among these variables (see Table 1). Considering just these simple correlations, CES was moderate to strongly related to both PTG and

Table 1
Descriptive Statistics and Zero-Order Correlations

	M	*SD*	1	2	3	4	5	6	7
1. Core beliefs challenge	2.60	1.17							
2. Deliberate rumination	1.47	.75	.49**						
3. Intrusive rumination	1.35	.82	.37**	.55**					
4. Found meaning	5.17	1.21	−.11	−.15*	−.21**				
5. Search for meaning	4.74	1.49	.25**	.26**	.12	−.34**			
6. Centrality of event	2.92	.92	.47**	.54**	.50**	−.21**	.27**		
7. PTSD symptoms	33.98	13.04	.43**	.53**	.63**	−.35**	.27**	.52**	
8. Posttraumatic growth	47.30	22.63	.45**	.37**	.16*	.20**	.04	.38**	.12

Note. $N = 187$.
* $p < .05$. ** $p < .01$.

PTSD symptoms. Variables not expected to be associated with each other, such as PTG with the search for meaning or posttraumatic distress symptoms, showed nonsignificant correlations.

To determine whether centrality of event contributes uniquely to both symptoms of posttraumatic distress and to PTG when other predictors are included, the data were submitted to two separate hierarchical regression analyses. In the first regression, factors expected to contribute to distress (challenge to core beliefs, intrusive rumination, and the search for meaning) were entered separately into the hierarchical regression model, with scores on the PTSD checklist as the criterion variable (see Table 2). Challenge to core beliefs accounted for 18% of the variance in PTSD symptoms (Fchange = 41.30, $p < .01$). Intrusive rumination (Fchange = 85.73, $p < .01$), and search for meaning (Fchange = 7.80, $p < .01$) each added significantly to the model, predicting an additional 26% and 3% of the variance, respectively. In the fourth and final step of the regression analysis, centrality of event significantly accounted for an additional 2% of the variance in posttraumatic distress symptoms (Fchange = 8.29, $p < .01$). The results of the first regression analysis indicate that centrality of event does indeed contribute uniquely to symptoms of posttraumatic distress after controlling for other factors known to be related.

The results of the second regression analysis are shown in Table 3. In the first three steps, factors previously shown to contribute to posttraumatic growth (Cann et al., 2011) are controlled for. In the first step of the model, the challenge to core beliefs accounted for 45% of the variance in PTG (Fchange = 45.71, $p < .01$). Both intrusive and deliberate rumination were added jointly in the second step of the model, and together predicted an additional 3% of the variance (Fchange = 3.85, $p < .05$). In the third step of the model, found meaning explained 6% of the variance in PTG (Fchange = 16.82, $p < .01$). Finally, centrality predicted 4% of the variance in PTG, above and beyond the contributions of the other variables in the model (Fchange = 10.91, $p < .01$).

Discussion

One purpose of this study was to assess the extent to which centrality of event is related to reports of PTG. Although this

Table 2
Hierarchical Multiple Regression Analysis Predicting Symptoms of Posttraumatic Distress

Model	*b*	*SE*	β	R^2	ΔR^2
Step 1				.18**	.18**
(Intercept)	21.59**	2.11			
Core beliefs challenge	4.76**	.74	.43		
Step 2				.44**	.26**
(Intercept)	15.66**	1.86			
Core beliefs challenge	2.52**	.66	.23		
Intrusive rumination	8.70**	.94	.55		
Step 3				.47**	.03**
(Intercept)	10.37**	2.64			
Core beliefs challenge	2.11**	.66	.19		
Intrusive rumination	8.62**	.92	.54		
Search for meaning	1.37**	.49	.16		
Step 4				.49**	.02**
(Intercept)	6.78*	2.87			
Core beliefs challenge	1.48*	.69	.13		
Intrusive rumination	7.50**	.99	.47		
Search for meaning	1.12*	.49	.13		
Centrality of event	2.70**	.94	.19		

Note. $N = 187$. *b* = unstandardized beta weight.
* $p < .05$. ** $p < .01$.

Table 3
Hierarchical Multiple Regression Analysis Predicting Posttraumatic Growth

Model	*b*	*SE*	β	R^2	ΔR^2
Step 1				.45**	.45**
(Intercept)	24.90**	3.63			
Core beliefs challenge	8.60**	1.27	.45		
Step 2				.48**	.03*
(Intercept)	22.25**	3.93			
Core beliefs challenge	7.14**	1.45	.37		
Intrusive rumination	−2.78	2.16	−.10		
Deliberate rumination	6.96**	2.51	.23		
Step 3				.54**	.06**
(Intercept)	−5.34	7.71			
Core beliefs challenge	7.25**	1.39	.38		
Intrusive rumination	−1.50	.10	−.05		
Deliberate rumination	7.24**	2.41	.24		
Found meaning	4.87**	1.19	.26		
Step 4				.58**	.04**
(Intercept)	−17.75*	8.40			
Core beliefs challenge	6.08**	1.40	.32		
Intrusive rumination	−3.17	2.11	−.12		
Deliberate rumination	5.07*	2.44	.17		
Found meaning	5.32**	1.16	.29		
Centrality of event	6.32**	1.91	.26		

Note. $N = 187$. b = unstandardized beta weight.
* $p < .05$. ** $p < .01$.

hypothesized relationship has been previously supported (Boals & Schuettler, 2011), centrality of event had not yet been shown to be a significant contributor to predictions of PTG above and beyond variables already known to be associated with PTG. The current findings indicate that centrality of the event does explain unique variance, even after controlling for the influence of core beliefs challenge, deliberate rumination, and the presence of meaning in the event.

The second aim of this study was to assess the unique contribution of centrality of event to symptoms of posttraumatic distress, while again controlling for variables previously shown to be associated with these symptoms. The present results indicate that centrality of event is a small but significant unique predictor of symptoms of posttraumatic distress, which replicates previous findings (Berntsen & Rubin, 2006; Boals & Schuettler, 2011). The present study demonstrates that centrality of event makes a small but unique contribution to posttraumatic distress, even when variables known to be related to distress are controlled for. These variables were disruption of core beliefs, intrusive rumination, and the search for meaning of the event. Once these variables controlled for, centrality of event accounted for an additional 2% of the variance in distress.

The finding that, in the aftermath of a trauma, centrality of event contributes to both distress and growth may at first seem paradoxical. Posttraumatic symptoms and PTG were not significantly correlated, suggesting that, although centrality may contribute to the development of both, distress and growth can exist independently of one another. The same cognitive disruption that can produce posttraumatic distress can set in motion the processes that can lead to the experience of growth. Although the original catalyst for both may be the same, the paths to distress and growth appear to involve different factors (Calhoun & Tedeschi, 2010).

One important factor that may contribute to greater or lesser growth, or distress, is the still unexamined possibility that people may code the struggle with a traumatic event as centrally positive or negative. Those who view themselves as a "victor," as opposed to a "victim," of the struggle with a major life crisis may thus experience different outcomes. Further research can profitably examine the relationship between posttraumatic distress, PTG, and the positive or negative valence individuals assign to traumatic events that have become important parts of the their self-concepts. Moreover, the processes that contribute to the development of one identity over the other are still unclear. Another important question that is left unanswered is whether centrality produces symptoms of distress, or whether the experience of symptoms may cause an event to become more central.

The results of this study carry several possible clinical implications. A clear positive relationship between symptom severity and centrality of event has been shown. Although the causal relationship between these two variables is unclear, these results do suggest that, to the extent that a person regards an event as a turning point in one's life (McAdams, 2006) and assumes the identity of a victim of a traumatic event, this may be one avenue that clinician's can use to address symptomatology. Although the amount of variance accounted for by centrality of event is small, centrality may be a significant element for some clients. Even if is has only a small degree of influence, centrality might be an undesirable element that serves as a tipping point for distressing posttraumatic distress, at least in some people.

Additionally, when treating people with posttraumatic distress, clinicians may want to attend to the adaptive rebuilding of the assumptive world (Janoff–Bulman, 2006). Clinicians may need to help individuals rebuild an understanding of themselves and their place in the world in a way that is both adaptive, and sensitive to the multiple ways in which individual world views can vary with unique cultural niches (Weiss & Berger, 2010).

In the present study, events that had become central to one's identity were associated with both positive and negative self-

reported outcomes, but people who were better able to find meaning in the event experienced higher levels of PTG. Clinicians need to be alert to the degree to which traumatic events are becoming either positive and adaptive components of the individual's identify and life narrative, or negative and maladaptive components. When highly stressful events become central to identity, the valence of this centrality is an important consideration, since the available data suggests that centrality can be double-edged (Boals & Schuettler, 2011).

This study has important limitations and interpretation of the findings must be done with them in mind. One potential limitation, as Dohrenwend, Link, Kern, Shrout, and Markowitz (1990) have pointed out, is that measuring stressful life events using subjective ratings from participants can be problematic due to intracategory variability among participants. That is, within each category of event, individuals may report a wide range of influence that the event had on their lives. Although we acknowledge that the traumatic events used for inclusion criteria may invoke highly variable responses between participants, the exclusion of participants who rated the event as less than a 5 on a 7-point scale of stressfulness may partially address this concern.

Another potential limitation is that the study was conducted on a sample of undergraduate psychology students at a major public university in the southern United States. The mean age of participants was 21.4 years ($SD = 4.95$), which may limit generalization to older adults. Data do suggest that college students have significant trauma histories and tend to report levels of trauma exposure similar to those in the general population (Read, Ouimette, White, Colder, & Farrow, 2011). The results of this study should be generalized to other populations with caution, but it is possible that they may be informative beyond this sample. The cross-sectional design of the study also serves as a limitation, since a longitudinal study would be needed to track how PTG and symptoms of PTSD develop over time. Event centrality appears to be a useful variable for understanding both PTG and posttraumatic distress, but The Centrality of Event Scale, used in this study, does not assess whether the event is viewed as centrally positive or centrally negative. Future studies are needed to determine the psychological consequences of viewing the struggle with a highly negative event as a significantly positive or a significantly negative turning point in life.

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Received September 9, 2011
Revision received February 14, 2012
Accepted March 31, 2012 ■