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Grief, Traumatic Stress, and Posttraumatic Growth in Women Who Have Experienced Pregnancy Loss

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Objective: Pregnancy loss is common and can be devastating for those who experience it. However, a historical focus on negative outcomes, and grief in particular, has rendered an incomplete portrait of both the gravity of the loss, and the potential for growth in its wake. Consistent with contemporary models of growth following bereavement, this study explored the occurrence of posttraumatic growth following pregnancy loss and further assessed the role of core belief disruptions and common loss context factors across perinatal grief, posttraumatic stress symptoms, and posttraumatic growth. ***Method:*** Women who had experienced a miscarriage or stillbirth ($N = 328$) were recruited through perinatal loss support groups and completed an online survey that assessed core belief disruption, perinatal grief, posttraumatic stress symptoms, posttraumatic growth, loss context factors, and demographics. Hypotheses were tested via hierarchical multiple regression. ***Results:*** All hypotheses were supported. Specifically, (a) moderate levels of posttraumatic growth were reported; (b) core belief disruptions predicted perinatal grief, posttraumatic stress symptoms, and posttraumatic growth; and (c) perinatal grief predicted posttraumatic stress symptoms and growth. ***Conclusion:*** Findings suggest that pregnancy loss can be a traumatic event, that core belief disruptions play a significant role in posttrauma outcomes, and that other factors may contribute to grief, posttraumatic stress symptoms, and posttraumatic growth following pregnancy loss that warrant further research (e.g., rumination). Despite potential methodological and sampling limitations, the use of validated measures to assess posttraumatic growth in a large sample represents a robust attempt to quantify the occurrence of posttrauma change following pregnancy loss.

Keywords: pregnancy loss, perinatal loss, grief, posttraumatic growth, posttraumatic stress

The death of an unborn child can be a devastating, life-altering event. Historically, research has focused on parental grief reactions and affective responses. However, there is increasing scholarly acknowledgment of the traumatic potential of reproductive losses (Black, Wright, & Limbo, 2016) and more broadly, that a singular focus on "negative" outcomes paints an incomplete picture of human responses to challenging events (Seligman, 1999). Despite assertions of its likelihood (e.g., Black & Wright, 2012), few published studies have examined posttraumatic growth (PTG) following reproductive losses and none have yet examined the extent to which PTG might occur following the most common of these—miscarriage and stillbirth. Additionally, although disruption of core beliefs is central to theories of trauma and PTG (e.g., Calhoun & Tedeschi, 2006; Janoff-Bulman, 1992), this disruption is rarely tested. The current research aims to address this gap.

In the current study, pregnancy loss refers collectively to the spontaneous death of an embryo, fetus, or baby via miscarriage or stillbirth. Stillbirth is defined as the death of a baby or fetus, prior to its birth or removal, of at least 20 weeks' gestation (Li, Zeki, Hilder, & Sullivan, 2013), and miscarriage as the death of a fetus or embryo prior to this point. However, categorical demarcations between miscarriage and stillbirth likely hold little utility when considering responses to loss (Creamer, McFarlane, & Burgess, 2005).

Grief following pregnancy loss often involves depressed mood, anxiety, irritability, difficulty sleeping and eating, and longing for the lost baby. The most intense grief reactions typically decrease within the first 12 months, and significantly after about 2 years, although the course of grief is variable, and bereaved parents frequently report experiencing grief for many years after the loss (Badenhorst & Hughes, 2007; Brier, 2008). Emerging models of perinatal bereavement (e.g., Wright, 2016) suggest that parents often experience intense grief and distress in the short term, resign themselves to the loss over time, and learn to live a changed life in the aftermath. These reports mirror the processes of core belief disruption and PTG following potentially traumatic events, as discussed below.

Consistent with current diagnostic classifications for posttraumatic stress disorder, a traumatic event is one in which an individual experiences "actual or threatened death" or witnesses that of another (American Psychiatric Association [APA], 2013, p. 271). Hence, the maternal experience of the death of her unborn child can be understood as potentially traumatic. Regardless of the event, it is the overwhelming psychological distress related to the experience that characterizes psychological trauma (Schwerdtfeger

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& Shreffler, 2009). In the extant pregnancy loss literature, posttraumatic stress symptoms are relatively common. In one longitudinal study, 25% of participants met criteria for posttraumatic stress disorder 1 month after experiencing a miscarriage (Engelhard, van den Hout, & Arntz, 2001); another found 39% of participants met posttraumatic stress disorder criteria after 1 month (Bowles et al., 2006). Similar findings follow stillbirth, with people reporting moderate to high levels of posttraumatic stress symptoms soon after the loss, and moderate levels after 1 year (Murphy, Shevlin, & Elklit, 2014).

Assumptive worldviews are higher-order schemas that people use to navigate the world and make sense of their place in it. Janoff-Bulman (1992) proposed that these schemas are comprised of three primary core beliefs relating to benevolence, meaningfulness of the world, and worthiness of the self. Challenges to these assumptions necessitate a cognitive shift. When challenges are small, a process of accommodation resolves discrepancies with existing core beliefs. However, some challenges can be so discrepant that core beliefs are rendered inadequate to make sense of the event. These challenges can force such violent changes in understanding that the individual's worldview is shattered, and it is in these situations that trauma ostensibly ensues. Following rupture of these assumptions, people struggle to make sense of the event. Put simply, when sense cannot be made, trauma persists; when sense can be made, it is through reorganization of schema that often leads to personal change. Consistent with challenges to core beliefs, perinatally bereaved parents often report themes of unfairness, guilt, and loss of control (Toedter, Lasker, & Alhadeff, 1988; Wojnar, Swanson, & Adolfsson, 2011). Studies that have directly assessed core belief disruption using the Core Beliefs Inventory (CBI; Cann et al., 2010) have shown moderate correlations between core belief disruptions and both posttraumatic stress symptoms and PTG (Lindstrom, Cann, Calhoun, & Tedeschi, 2013; Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012).

Posttraumatic growth refers to positive changes that people may experience following the struggle with challenging events, including bereavement (Calhoun & Tedeschi, 2006; Calhoun, Tedeschi, Cann, & Hanks, 2010). Typically witnessed in three broad domains—perception of self, relating to others, and philosophy of life—PTG can be seen as a collection of positive behavioral and attitudinal outcomes of the cognitive shift that Janoff-Bulman (1992) described following core belief disruption. Importantly, PTG is not ubiquitous nor does it imply an end to difficulty. Indeed, people who experience growth often do so in the context of ongoing distress (Shakespeare-Finch & Lurie-Beck, 2014; Tedeschi & Calhoun, 2008). Büchi and colleagues' studies (Büchi et al., 2007, 2009) represent the only published attempt to quantify PTG following perinatal loss to date. Therein, moderate levels of PTG were recorded across the total and all five dimension of the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) and PTG was positively associated with grief scores. While important, generalizability was limited by sample size ($N = 54$), cohort specifics (neonatal losses of preterm babies), and use of a nonstandard PTGI (three-point response scale).

Previous research has shown that contextual factors variously affect pregnancy loss outcomes. Although studies report mixed findings, most report positive associations between gestation and both grief (Toedter et al., 2001) and posttraumatic stress symptoms (Daugirdaitė, van den Akker, & Purewal, 2015). However, gestation duration per se may not be as important as a parent's developing bond with their unborn child—prenatal attachment—which typically intensifies over time. Indeed, the way a parent perceives the personhood and reality of their unborn child likely underpins perinatal attachment and better predicts distress following perinatal loss (Hutti, Armstrong, & Myers, 2013). Grief and posttraumatic stress responses typically decrease over time, postloss (Badenhorst & Hughes, 2007; Daugirdaitė et al., 2015). However, the cognitive work required to rebuild core beliefs as a foundation of PTG may be inhibited by intense distress (Shakespeare-Finch & Lurie-Beck, 2014) or may simply take time to occur. History of losses has been positively associated with increased depressive symptoms, but not typically with grief or posttraumatic stress symptoms (Engelhard et al., 2001; Janssen, Cuisinier, de Graauw, & Hoogduin, 1997). It is not known whether multiple losses might affect the occurrence of growth. Individuals who have no living children typically report higher grief and distress scores (Janssen et al., 1997; Schwerdtfeger & Shreffler, 2009) and may be less likely to experience PTG than those who have living children (Paul et al., 2010).

The current research aims to assess to what extent PTG might occur following pregnancy loss, in the context of other common psychological outcomes (i.e., perinatal grief and posttraumatic stress), and to assess the roles that core belief disruptions and perinatal grief might play across these outcomes when commonly researched contextual factors are accounted for. It is hypothesized that (a) women who have experienced miscarriage or stillbirth will report moderate levels of PTG; (b) core belief disruptions will be a positive, significant predictor of all three outcomes (PTG, posttraumatic stress symptoms, and perinatal grief) when loss context factors are controlled for; and (c) perinatal grief will be a significant, unique predictor of posttrauma outcomes.

Method

Participants

Participants were 328 women who had been bereaved by pregnancy loss via miscarriage ($n = 174$; <20 weeks gestation) or stillbirth ($n = 154$; ≥20 weeks gestation). Participants were predominantly Caucasian (93.60%), married or de facto partnered (84.76%), and well educated (77.44% were tertiary educated). The mean age was 34.52 years ($SD = 6.80$), the mean time since loss was 4.01 years ($SD = 5.95$), and the mean gestation at time of loss was 20.13 weeks ($SD = 10.04$). The mean number of other losses was 1.21 ($SD = 2.09$)—half of participants (51.22%) had experienced one loss, 22.26% had experienced two, and 24.39% had experienced between three and seven losses. Most participants (76.52%) had living children.

Procedure

Participants were recruited through pregnancy loss support organizations following approval by the university's ethics committee. Women were invited to participate if they had experienced a miscarriage or stillbirth, were age 18 years or older, and identified as proficient in written English. No incentives or compensation were offered. The supporting organizations forwarded participation invitations via membership publications, Web pages, and

social media. Participants self-identified with eligibility criteria and completed an online survey. Participation was voluntary, anonymous, and confidential.

Materials

Demographic variables included current age, ethnicity, education level, and relationship status at the time of loss. Loss context factors assessed were time since the loss, gestational age of the baby or fetus at the time of loss, number of previous losses, and whether participants had living children. Personhood and event severity were also considered as loss context factors. Participants were asked to rate, from 0 (*not at all*) to 9 (*a very great degree*), the degree to which they believed their baby or pregnancy was a person in the period immediately before their loss. A definition of a traumatic event, based on the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.) conceptualization of trauma (APA, 2013), was also provided and participants rated the severity of their experience from 0 (*not traumatic*) to 9 (*very severely traumatic*). Variations of this scale have often been used in trauma research to control for trauma severity (e.g., Shakespeare-Finch & Barrington, 2012).

Core belief disruption was measured using the CBI (Cann et al., 2010), a nine-item measure that is based primarily on Assumptive Worldview theory (Janoff-Bulman, 1992). Participants rated the degree to which the loss forced their reevaluation of core assumptions about the world, others, themselves, and the future. Responses range from 0 (*not at all*) to 5 (*to a very great degree*). Items include "Because of the loss I seriously examined the degree to which I believe things that happen to people are controllable" and ". . . examined my beliefs about the meaning of my life." The CBI has good internal consistency ($\alpha = .82$; $\alpha = .85$ in the current study) and acceptable test–retest reliability ($r = .64$; Lindstrom et al., 2013).

The Perinatal Grief Scale (PGS; Toedter et al., 1988) was used to assess behavioral and affective symptoms of grief following the loss. Respondents rated 33 items on a scale from 1 (*strongly agree*) to 5 (*strongly disagree*) that were summed to yield a total score. Items include "I am grieving for the baby," "I cry when I think about him/her," and "I blame myself for the baby's death." The PGS has excellent internal consistency ($\alpha = .95$; replicated in the current study). A clinical cut-off of 91 has been established for the PGS, where greater scores indicate a high level of perinatal grief (Toedter, Lasker, & Janssen, 2001).

The Impact of Events Scale—Revised (IES-R; D. Weiss & Marmar, 1997) was used to assess posttraumatic stress symptomology. Respondents rated 22 questions on a scale from 0 (*not at all*) to 4 (*often*), indicating the experience of symptoms over the prior 7 days. Higher scores represent greater posttraumatic stress symptoms. Items include "I had trouble staying asleep," "I stayed away from reminders about it," and "I felt watchful and on guard." The total score has excellent internal consistency ($\alpha = .96$; $\alpha = .95$ in the current study), good convergent validity with other measures of posttraumatic stress symptomology, and good test–retest reliability (Creamer, Bell, & Failla, 2003; D. Weiss & Marmar, 1997). A total score above 33 is considered a reliable indicator of clinically significant posttraumatic stress symptomology (Creamer et al., 2003).

PTG was measured using the PTGI (Tedeschi & Calhoun, 1996), a 21-item measure of positive changes that may be experienced in the aftermath of trauma. Participants rated from 0 (*not at all*), to 5 (*a very great degree*), the occurrence of personal changes that had arisen pursuant to their loss. Items include "I established a new path for my life," "Having compassion for others," and "A willingness to express my emotions." The PTGI yields a total score of posttraumatic growth, or scores for five dimensions—Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation of Life. The PTGI has excellent internal consistency ($\alpha = .93$; $\alpha = .92$ in the current study), acceptable test–retest reliability ($r = .71$; Tedeschi & Calhoun, 1996), and convergent validity with significant-other reports of growth (Shakespeare-Finch & Barrington, 2012). Factor analyses have confirmed the five-factor structure of the PTGI (Morris, Shakespeare-Finch, Rieck, & Newbery, 2005; Tedeschi & Calhoun, 1996).

Results

Following preliminary analyses, three separate hierarchical multiple regressions were conducted that examined the ability of core belief disruptions to predict pregnancy loss outcomes when loss context factors were controlled for; and further, whether core belief disruptions remained significant predictors of posttraumatic stress symptoms and PTG after perinatal grief was accounted for. All statistical analyses used SPSS (Version 20).

Missing data (0.40% of observations) were replaced using expectation maximization methods (Newman, 2014). Bias-corrected and accelerated (*BCa*) bootstrapped analyses (2,000 samples) are reported where possible to counter potential issues with univariate nonnormality on time since loss, other losses, personhood, and severity variables. Regardless, normality of predictors enhances prediction of relationships between variables in hierarchical regression, so nonnormality is simply likely to provide conservative estimates (Tabachnick & Fidell, 2007). Assumptions relating to normality of residuals, influential cases, independence of observations, linearity, multicollinearity, and homoscedasticity were met for each of the three hierarchical regressions. All significance tests were two-tailed.

Descriptive and Correlational Data

Descriptive data for study measures are presented in Table 1. Mean personhood and severity scores were consistently high; 83.84% and 67.99% of participants respectively scored at least 8 of a possible 9, indicating that the majority of participants identified the loss as that of a person and that the experience was severely traumatic. CBI scores were moderately high, suggesting that participants, on average, reassessed their core beliefs about the world to a great degree following the loss.

PGS total and subscale means indicated high levels of perinatal grief across the entire sample. The mean of PGS total scores and 57.01% of individual scores were above the clinical cut-off of 91 (Toedter et al., 2001), suggesting that participants were still experiencing considerable grief. IES-R total and subscale means were moderate, but close to the clinical threshold of 33 (Creamer et al., 2003). Variability was highest for the IES-R than for any other measure, with 43.90% of participants

Table 1
Descriptive and Normality Statistics of Study Measures

Measure	Mean	*SD*	*BCa* 95% CI	Range		Skewness	Kurtosis
				Possible	Observed		
Age (years)	34.52	6.80			18–66	.96	2.76
Time since loss (years)	4.01	5.95			.01–40	3.56	15.59
Gestation (weeks)	20.13	10.04			5–41.57	.63	−.68
Other losses (number)	1.21	2.09			0–8	3.64	19.74
Personhood	8.40	1.37	[8.25, 8.54]	0–9	2–9	−2.76	7.81
Severity	7.88	1.59	[7.71, 8.05]	0–9	1–9	−1.91	4.22
CBI	29.85	9.23	[28.83, 30.89]	0–45	2–45	−.48	−.12
PGS	95.23	24.94	[92.67, 97.91]	33–165	39–160	.16	−.26
Active Grief	37.35	8.30	[36.46, 38.26]	11–55	12–55	−.32	−.14
Difficulty Coping	31.02	9.56	[30.03, 32.09]	11–55	11–55	.06	−.55
Despair	26.86	9.22	[25.91, 27.88]	11–55	11–54	.40	−.10
IES-R	30.77	19.73	[28.61, 33.05]	0–88	0–88	3.33	−.62
Avoidance	9.37	7.48	[8.55, 10.23]	0–32	0–32	5.76	−.01
Intrusion	14.09	8.08	[13.19, 15.00]	0–32	0–32	1.62	−.89
Hyperarousal	7.31	6.38	[6.62, 8.04]	0–24	0–24	4.86	−.50
PTGI	51.22	20.13	[49.27, 53.34]	0–105	2–105	.33	−.42
Relating to Others	18.33	7.60	[17.55, 19.15]	0–35	0–35	−.17	−.54
New Possibilities	10.00	6.23	[9.34, 10.66]	0–25	0–25	3.44	−.52
Personal Strength	10.91	5.01	[10.38, 11.46]	0–20	0–20	−1.70	−.84
Spiritual Change	2.77	2.93	[2.43, 3.09]	0–10	0–10	6.48	−.22
Appreciation of Life	9.21	3.38	[8.86, 9.56]	0–15	0–15	−2.17	−.57

Note. $N = 328$. *BCa* = bias corrected and accelerated; CI = confidence interval; CBI = Core Beliefs Inventory; PGS = Perinatal Grief Scale; IES-R = Impact of Events Scale—Revised; PTGI = Posttraumatic Growth Inventory.

reporting clinical levels of posttraumatic stress symptoms. Moderate PTG was reported in each dimension and overall. The greatest PTG was in dimensions of appreciation of life, personal strength, and relating to others.

The bivariate correlations displayed in Table 2 show that significant correlations between study variables were mostly moderate to weak. The strongest association was between perinatal grief and posttraumatic stress symptoms. Importantly, these measures were not collinear in the current study. Conversely, PTG was inversely related to grief scores, but not to posttraumatic stress symptoms. As hypothesized, core belief disruption was positively associated with perinatal grief, posttraumatic stress, and PTG; these were weak-to-moderate associations.

Main Analyses

Three regressions were conducted to test hypotheses. Loss context variables (i.e., time since the loss, gestation, personhood, severity, number of other losses, and a dummy-coded comparison between the "living children" categories) were entered in Step 1. CBI scores were entered at Step 2 to test the unique contribution of core belief disruption on all three outcomes (perinatal grief, posttraumatic stress symptoms, and posttraumatic growth). In the posttraumatic stress and posttraumatic growth models, PGS scores were added in Step 3 to test whether (a) the experience of perinatal grief was a significant predictor of posttrauma outcomes, and (b) core belief disruption remained a significant predictor of post-

Table 2
Bivariate Correlations (R) Between Measures Used in Main Analyses

Measure	1	2	3	4	5	6	7	8	9	10
1. Time since	—									
2. Gestation	.13*	—								
3. Personhood	.03	.27***	—							
4. Severity	.10	.22***	.42***	—						
5. Other losses	.04	−.16**	.00	.07	—					
6. Before[a]	−.06	−.07	.10	−.08	.15**	—				
7. After[a]	.34***	.08	.00	.06	.07	−.04	—			
8. CBI total	.00	.23***	.23***	.34***	.09	−.16**	.02	—		
9. PGS total	−.16**	.14*	.21***	.29***	.05	−.12*	−.26***	.39***	—	
10. IES-R total	−.23***	.07	.07	.21***	.03	−.05	−.30***	.27***	.71***	—
11. PTGI total	.12*	.20***	.09	.12*	.01	−.12*	.06	.29***	−.20***	−.02

Note. CBI = Core Beliefs Inventory; PGS = Perinatal Grief Scale; IES-R = Impact of Events Scale—Revised; PTGI = Posttraumatic Growth Inventory.
[a] Dummy coded; reference category is No Other Children.
* $p < .05$. ** $p < .01$. *** $p < .001$.

trauma outcomes after accounting for grief scores. Table 3 displays model summary statistics for each step, along with regression coefficients, significance values, and squared semipartial correlations for each predictor at the final step of each regression.

Perinatal grief. Loss context factors accounted for a significant 20.70% of the variance in perinatal grief. This was predominantly explained by the small-to-moderate contributions of personhood, severity, and the "other children" variables. Adding core belief disruption at Step 2 made a moderate significant contribution to the final model and explained an additional 6.92% of the variability in perinatal grief. Of the two other significant predictors in the final model, higher perceived severity predicted higher grief, but to a small degree. The "other children" comparisons indicated that women who did not have living children tended to experience moderately higher grief scores than those who had children after the loss. These two variables accounted for 1.96% and 5.43% of the variance, respectively. Combined, all variables accounted for 27.60% of the variance in perinatal grief.

Posttraumatic stress symptoms. In the second regression, loss context factors accounted for 17.60% of the variance in posttraumatic stress symptoms. This was predominantly explained by time since the loss, severity, and having children after the loss. Greater core belief disruption predicted a significant increase in posttraumatic stress at Step 2, but explained only 3.50% of the variability in posttraumatic stress symptoms. In the final model, more intense grief was associated with a large increase in posttraumatic stress symptoms. Perinatal grief explained a significant, additional 33.06% of the variance in posttraumatic stress symptoms. Despite being a significant predictor in Step 2, core belief disruption was not a significant predictor in Step 3. Combined, all predictors accounted for 54.10% of the variance in posttraumatic stress symptoms.

Posttraumatic growth. In the third regression, loss context factors made a significant contribution to the model, accounting for 6.50% of the variance in PTGI scores. This was predominantly explained by the contribution of gestation and having children before the loss, which were positively, but weakly, associated with PTG. Adding core belief disruption at Step 2 made a significant contribution to the model and explained an additional 5.15% of the variance in PTG scores. In the final model, perinatal grief made a moderately large contribution to prediction of PTG; more intense grief was associated with lower PTG. Perinatal grief explained an additional, significant 12.53% of the variance in PTG. Core belief disruption remained a significant predictor in Step 3 and explained 10.30% of the variance. Core belief disruption made a moderate contribution to predicting PTG; greater disruption was associated with greater PTG. Combined, all predictors accounted for 24.20% of the variance in PTG.

Discussion

This study explored to what extent women experience grief, posttraumatic stress, and PTG following pregnancy loss. All hypothesized relationships were supported. Specifically, (a) women who had experienced pregnancy loss reported moderate levels of PTG; (b) core belief disruption was a significant, positive predictor of perinatal grief, posttraumatic stress symptoms, and PTG after accounting for loss context variables; and (c) perinatal grief was a significant, unique predictor of PTG and posttraumatic stress symptoms.

Posttraumatic Growth

As hypothesized, women in the current study reported moderate levels of PTG following pregnancy loss. The greatest PTG was reported in appreciation of life, personal strength, and relating to others domains, and least in spiritual growth. The findings of limited spiritual growth are consistent with previous research in non-North American populations (e.g., T. Weiss & Berger, 2010), but may also be influenced by pregnancy loss-specific factors. Although some people tend toward spiritual understandings following perinatal loss, others report a marked departure (Cowchock, Lasker, Toedter, Skumanich, & Koenig, 2010). This suggests that some people's spiritual beliefs may provide a framework for understanding the loss, while others' beliefs may be rendered inadequate.

Grief and Posttraumatic Stress

On average, participants in the current study reported high to moderate levels of grief and posttraumatic stress symptoms, with nearly half scoring higher than established clinical cut-offs (Creamer et al., 2003; Toedter et al., 2001). Perinatal grief scores were consistent with previous research (Toedter et al., 2001) but reported levels of posttraumatic stress were considerably higher considering that the mean time since loss was just over 4 years. By this time, posttraumatic stress symptoms would typically be expected to have decreased considerably (Bonanno, 2004). However, participants in the current study were recruited exclusively through support groups, and levels of distress may reflect this, akin to a clinical sample. General population samples, which would likely include non-help-seeking participants, may report lower levels of posttraumatic stress symptoms.

Severity and Personhood

Almost 85% of participants in the current study rated personhood as at least 8 out of a possible 9. These findings confirm that most people viewed the death as that of their unborn child and considered the event to be extremely traumatic—even in early pregnancy. Hence, perceived personhood of the unborn baby and severity of the trauma play important roles in the occurrence of traumatic outcomes following pregnancy loss.

The above findings suggest that women can experience considerable, persistent posttraumatic stress and grief after pregnancy loss. Taken together with high severity scores, this confirms that pregnancy loss can be construed as a potentially traumatic event and that the traumatic potential of pregnancy loss should not be neglected. Additionally, women can also experience considerable PTG following pregnancy loss, even in the context of significant grief and distress.

Core Belief Disruption

As hypothesized, core belief disruption was evident following pregnancy loss and was a positive predictor of perinatal grief, posttraumatic stress symptoms, and PTG. That most participants reported moderate or greater reassessment of their core beliefs not

Table 3
Model Summaries and Final Model Regression Coefficients for the Hierarchical Multiple Regressions Predicting Perinatal Grief, Posttraumatic Stress Symptoms, and Posttraumatic Growth

	Perinatal grief						Posttraumatic stress						Posttraumatic growth					
Regression model	*R*	R^2 ($R^2_{adjusted}$)	ΔR^2	*F*			*R*	R^2 ($R^2_{adjusted}$)	ΔR^2	*F*			*R*	R^2 ($R^2_{adjusted}$)	ΔR^2	*F*		
Step 1	.46	.21 (.19)		$F(7, 320) = 11.91$, $p < .001$			.42	.18 (.16)		$F(7, 320) = 9.77$, $p < .001$			.26	.07 (.05)		$F(7, 320) = 3.18$, $p = .003$		
Step 2	.53	.28 (.26)	.07	$\Delta F(1, 319) = 30.41$, $p < .001$			.46	.21 (.19)	.04	$\Delta F(1, 319) = 14.20$, $p < .001$			.34	.12 (.09)	.05	$\Delta F(1, 319) = 18.53$, $p < .001$		
Step 3							.74	.54 (.53)	.33	$\Delta F(1, 318) = 228.98$, $p < .001$			.49	.24 (.22)	.13	$\Delta F(1, 318) = 52.53$, $p < .001$		
Predictor	*B*	*BCa* 95% CI_B	SE_B	β	*p*	sr^2	*B*	*BCa* 95% CI_B	SE_B	β	*p*	sr^2	*B*	*BCa* 95% CI_B	SE_B	β	*p*	sr^2
Time since	−.44	[−1.01, .07]	.26	−.10	.085	.009	−.28	[−.59, −.02]	0.16	−.09	.069	.006	.17	[−.12, .55]	0.18	.05	.317	.002
Gestation	.14	[−.10, .36]	.13	.06	.291	.003	.02	[−.15, .19]	0.08	.01	.766	.000	.30	[.09, .52]	0.10	.15	.003	.018
Personhood	1.21	[−.36, 2.75]	.76	.07	.105	.003	−1.55	[−2.81,−.20]	0.68	−.11	.019	.009	.49	[−1.18, 2.21]	0.91	.03	.593	.001
Severity	2.56	[1.06, 4.23]	.79	.16	.001	.020	.92	[−.29, 2.07]	0.6	.07	.124	.004	.71	[−.92, 2.42]	0.84	.06	.396	.002
Other losses	.63	[−.90, 1.76]	.70	.05	.345	.003	−.03	[−.69, .69]	0.34	.00	.939	.000	.36	[−.50, 1.28]	0.46	.04	.425	.001
Before[a]	−4.31	[−8.85, .35]	2.38	−.09	.071	.007	1.75	[−1.35, 4.91]	1.63	.04	.286	.002	−4.18	[−8.24,−.32]	2.11	−.10	.043	.010
After[a]	−12.43	[−17.57, −7.42]	2.66	−.25	<.001	.054	−3.96	[−7.61,−.32]	1.72	−.10	.023	.008	−3.61	[−7.72, .67]	2.21	−.09	.103	.007
Core belief disruption	.79	[.52, 1.06]	.14	.29	<.001	.069	.02	[−.16, .19]	0.09	.01	.792	.000	.81	[.55, 1.05]	0.14	.37	<.001	.103
Perinatal grief							.53	[.47, .60]	0.03	.68	<.001	.331	−.34	[−.43,−.24]	0.05	−.42	<.001	.125

Note. Adjusted = adjusted R^2; CI = confidence interval; β= standardized regression coefficient; sr^2 = squared semipartial correlation; *BCa* = bias corrected and accelerated.
[a] Dummy-coded "Other children" comparisons; reference category is No Other Children.

only confirms that a mother's core understandings of the world can be disrupted by pregnancy loss, but suggests that this may be quite common. Core belief disruption was a positive predictor of grief and the posttrauma outcomes measured, consistent with theory and research (e.g., Calhoun et al., 2010; Lindstrom et al., 2013). Although core belief disruption predicted perinatal grief scores, this is more likely characteristic of traumatic or complicated grief responses than a universal characteristic of grief (Currier, Holland, & Neimeyer, 2009) and underscores the importance of considering traumatic responses to pregnancy loss.

Grief as a Predictor of Posttrauma Outcomes

Perinatal grief was a significant predictor of both posttraumatic stress symptoms and PTG in the current study. In the posttraumatic stress regression, perinatal grief explained both the contribution of core belief disruption and variance in posttraumatic stress symptoms, suggesting that grief following pregnancy loss is a large factor in posttraumatic stress responses. However, higher grief scores predicted lower PTG, which is similar to previous findings with bereaved parents (e.g., Engelkemeyer & Marwit, 2008). These authors suggested that another variable might mediate the relationship between grief and growth, such as core beliefs. However, grief itself may mediate the relationship of core belief disruptions to both distress and growth, especially given that core belief disruption can be seen as antecedent to psychological outcomes. Alternatively, a curvilinear relationship may exist between traumatic grief responses and growth (Shakespeare-Finch & Lurie-Beck, 2014). Although the current study provided no evidence of curvilinearity, the high levels of traumatic grief that characterized the current sample may represent a restriction of range in which a lack of minimally traumatized people would mask a curvilinear relationship.

Predictive Models

The combined loss context factors accounted for a large proportion of variance in both negative outcomes, but considerably less in PTG. Core belief disruption was the only significant predictor across all three outcomes. That these situational variables were drawn primarily from perinatal loss literature partly explains their limited predictive utility for PTG. Still, the considerable skewness evident in four of the loss context variables (i.e., time since the loss, personhood, severity, and number of other losses) likely led to an underestimation of the relationships between variables in the regressions (Tabachnick & Fidell, 2007). Nevertheless, the differential effect of predictors between models underscores the distinction between negative outcomes and PTG and suggests that the factors that influence PTG are different to those that underlie grief and distress. The lack of relationship between PTG and posttraumatic stress symptoms also supports the notion that the two constructs are distinct.

The primary goal of the current study was to gain an understanding of the way certain commonly researched variables (i.e., loss context variables), and one hypothesized variable (i.e., core belief disruption) might affect each of the three identified pregnancy loss outcomes (i.e., perinatal grief, posttraumatic stress symptoms, and PTG). Still, the proportion of variance accounted for in these outcomes, especially in PTG, indicates that there are clearly other factors that contribute to their occurrence.

Strengths, Limitations, and Future Research

One of the strengths of the current study is that it is the first to quantitatively target PTG following pregnancy loss with validated measures of outcomes that are common to both perinatal loss (PGS) and trauma (IES-R, PTGI) research. The use of regression models allows for comparison of the predictors across outcomes and provides context for the discussion of PTG. Regressions also allowed the inclusion of control variables, which may have otherwise created confounds in such a broad sample (e.g., gestation, time since loss).

Several limitations may affect the interpretation or generalizability of this study's findings. First, participants were a self-identified convenience sample of well-educated, Caucasian, Australian women who were highly traumatized but engaged in online support communities. It is possible that some of these factors may have influenced reports of perceived growth, grief, or distress. For example, support group samples tend to record higher PGS scores (Toedter et al., 2001); people who experience no distress may not seek support, creating an inherent sampling bias. Similarly, participant self-identification may facilitate response bias. For example, people who felt it inappropriate to consider personal growth as a potential outcome of pregnancy loss may have declined to participate. However, studies that have asked bereaved parents about their experience of research suggest that the vast majority welcome the opportunity to tell their stories (Hynson, Aroni, Bauld, & Sawyer, 2006). Additionally, online samples may not be representative and results should be generalized with due caution in the absence of confirmatory data. Future recruitment of participants from broader populations could provide samples with more normally distributed characteristics and would help to clarify the representativeness of the current findings.

Second, this study used a cross-sectional, correlational design. Despite discussion of theorized temporal relationships between variables, the nature of correlational design prevents the drawing of causal conclusions. Furthermore, the retrospective assessment of some elements (i.e., personhood, severity, core belief disruption) may be susceptible to recall bias and perceptions of each of the major outcomes may be influenced by perceptions of the other(s). Also, single-item measures may be inadequate to accurately measure concepts as complex as trauma severity or personhood, and different findings may emerge with more detailed measures. Regardless, designs such as those used in the current study are common in both PTG and perinatal loss literature and represent a consistent approach to the study of these constructs. Longitudinal designs would enable future studies to make inferences about the temporal ordering and potential causality of included constructs.

Together with the current study's findings, PTG (Calhoun et al., 2010; Calhoun & Tedeschi, 2006) and perinatal bereavement models (e.g., Wojnar et al., 2011; Wright, 2016) raise further questions about which factors underpin PTG and traumatic grief following perinatal loss. In particular, the model of PTG asserts that effortful rumination is central to the cognitive work that occurs pursuant to core belief disruptions, and the rebuilding of schemas that facilitate PTG. Recent research has suggested that effortful and intrusive rumination play differential roles in the occurrence of positive and negative posttrauma outcomes (Taku, Cann, Tedeschi, & Calhoun, 2009; Triplett et al., 2012). Factors such as social support are frequently implicated in perinatal loss outcomes and ostensibly

play both a direct role in the facilitation of effortful rumination and PTG and an indirect role by helping to reduce intrusive rumination and negative outcomes (Lindstrom et al., 2013). Effortful rumination is likely also part of the "working through" that Wright's (2016) model describes. As such, the roles of effortful and intrusive rumination in the occurrence of postbereavement outcomes and the interplay between social support and rumination may be fruitful areas for future research in the study of perinatal loss.

Practical Implications

The findings of the current study are relevant to all practitioners who work with women who have experienced pregnancy loss. The traumatized nature of the sample confirms that pregnancy loss is not only a bereavement event, but also potentially traumatic. Practitioners should be mindful that bereaved mothers can experience considerable grief and distress in the short term, but also clinically significant posttraumatic stress symptoms both soon and for extended periods after the loss. Practitioners should therefore take care to not downplay the perceived importance of any aspect of the mother's loss—regardless of gestation. Although not all mothers may feel this way, empathic engagement with a mother's understanding of the event would likely be central to maintaining rapport and delivering appropriate care. Practitioners should also be aware that bereaved mothers might not only be struggling with the loss, but also in making sense of the world and their place in it. Indeed, it has been suggested that for those who need intervention following bereavement, what is most needed is help to reconstruct their beliefs, ways of making meaning, and understanding of their place in the world (Cann et al., 2010; Gillies & Neimeyer, 2006).

The current study's findings of PTG raise pertinent questions regarding how growth might be facilitated in the aftermath of pregnancy loss. It is important not to overgeneralize the possibility of growth, or even to presume that growth is an aspirational outcome. Indeed, some bereaved individuals may find the very idea repugnant (Tedeschi & Calhoun, 2004). Instead, therapeutic work that is cognizant of PTG should focus on helping bereaved parents to regulate emotions and manage their significant distress (Triplett et al., 2012). Subsequent therapeutic work should assist bereaved individuals to work through their shattered view of the world and support efforts to rebuild their core beliefs and understandings (Tedeschi & Calhoun, 2004). In doing so, if evidence of PTG emerges, it can be explicitly discussed, both as grist for the therapeutic mill and to assist bereaved individuals in rebuilding core beliefs relating to their capabilities, relationships, and perspectives of the world. Practitioners may thus help the bereaved to see themselves as more than a bereaved parent, and perhaps see their personal change as a legacy of their baby's life.

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