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Cognitive Predictors and Risk Factors of PTSD Following Stillbirth: A Short-Term Longitudinal Study

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Abstract

This short-term longitudinal study investigated cognitive predictors and risk factors of posttraumatic stress disorder (PTSD) in mothers following stillbirth. Sixty-five women following a stillbirth at ≥24 weeks gestational age completed structured clinical interviews and questionnaires assessing PTSD symptoms, cognitive predictors (appraisals, dysfunctional strategies), and risk factors (perceived social support, trauma history, obstetric history) at 3 and 6 months. PTSD symptoms decreased between 3 and 6 months (Cohen's *d* ranged .34–.52). Regression analyses also revealed a specific positive relationship between 'Rumination and concurrent frequency of PTSD symptoms (*B* = .45). Negative self-view and Negative world-view related positively and Self-blame related negatively to concurrent number of PTSD symptoms (*B* = .48, .44, -.45 respectively). Suppression and Distraction predicted a decrease and Numbing predicted an increase in time-lagged number of PTSD symptoms (*B* = -.33, -.28, .30 respectively). Risk factors for PTSD symptoms were younger age (*B* = -.25), lower income (*B* = -.29), fewer previous pregnancies (*B* = -.31), and poorer perceived social support (*B* = -.26). Interventions addressing negative appraisals, dysfunctional strategies, and social support are recommended for mothers with PTSD following stillbirth. Knowledge of cognitive predictors and risk factors of PTSD may inform the development of a screening instrument.

Cognitive Predictors and Risk Factors of Posttraumatic Stress Following Stillbirth: A Short-Term Longitudinal Study

Stillbirth can be experienced as a traumatic event. Although it is relatively common, with one in 200 births in the UK ending in stillbirth (Department of Health, 2014), it is often treated as less significant than other types of child loss. This can leave parents feeling isolated and as though their loss has not been validated (Froen et al., 2011). Parents report intense symptoms of grief, poor coping, despair, worthlessness, isolation, and guilt up to 10 years following stillbirth (Cacciatore, 2010; Hunfeld, Wladimiroff & Passchier, 1997; Janssen, Cuisinier, de Graauw & Hoogduin, 1997).

Although most women regain a sense of purpose and adjust well, 15%–25% of women have enduring adjustment difficulties and seek professional support in the first year following loss (Bennett et al., 2005). Following stillbirth, mothers are more likely to experience higher anxiety and depressive symptoms for up to three years, compared with mothers of live born babies (Cacciatore, Rådestad & Frøen, 2008; Carrera et al., 1998). They are also at risk of experiencing anxiety (Armstrong, 2002) and posttraumatic stress disorder (PTSD) during a subsequent pregnancy (Turton, Hughes, Evans & Fainman, 2001) or after the birth of a healthy baby (Armstrong, Hutti & Myers, 2009). Two studies of mothers following late loss (i.e., loss after 24 completed weeks of pregnancy) found 11% PTSD diagnosis at 2–4 months and 8% at 14–16 months post loss (Jind, 2003) and 13% after 5–18 years (Gravensteen et al., 2013). Thus, changes may not be linear and it is unclear whether symptoms increase or decrease over time.

There is a lack of detailed investigation of the time course of PTSD following stillbirth. Most studies group together different types of perinatal loss, which is not helpful given the different psychological impact of early and late perinatal loss (Campbell-Jackson & Horsch,

2014). So far, no study of which we are aware has investigated the cognitive predictors of PTSD after stillbirth.

Given the lack of a theoretical base (Ayers & Olander, 2013), a well-established cognitive model that was shown to predict PTSD following childbirth (Ayers, Harris, Sawyer, Parfitt & Ford, 2009) will be used as a base for the current study. Ehlers and Clark (2000) proposed that persistent PTSD occurred if an individual processed the trauma or its sequelae in a way that produced a current sense of threat. Important cognitive elements of this model are negative appraisals and dysfunctional strategies (e.g., thought suppression, cognitive avoidance, and rumination) that maintain the sense of current threat in PTSD by directly producing symptoms, and preventing change in negative appraisals and the nature of the trauma memory. Negative appraisals are associated with more PTSD symptoms after traumatic childbirth at 3 weeks and 3 months postpartum (e.g., Ford, Ayers & Bradley, 2010). Several studies have demonstrated the role of dysfunctional cognitive strategies in predicting PTSD in other trauma populations (e.g., Michael, Ehlers, Halligan & Clark, 2005), but this has not been investigated in a postnatal population (women who have given birth within the past 12 months to a live or stillborn infant). There are no studies of which we are aware examining risk factors for PTSD following stillbirth but previous trauma and lack of social support were identified in a childbirth population (i.e., a population of pregnant women; e.g., Soderquist, Wijma & Wijma, 2006).

This short-term longitudinal study (with measurements taken at 3 and 6 months after stillbirth) aimed to address the following questions: (a) how do PTSD symptoms change from 3 to 6 months post loss; (b) what are cognitive predictors of PTSD symptoms at 3 and 6 months; (c) do cognitive factors (appraisals, dysfunctional strategies) of PTSD at 3 months explain changes in PTSD symptoms at 6 months; and (d) what are the relationships between risk factors

(perceived social support, trauma history, obstetric history) and PTSD at 3 and 6 months?

Method

Partipants and Procedure

A consecutive sample of non-pregnant women over 18 years who had experienced a stillbirth at 24 weeks gestational age or later were approached via their bereavement midwife at eight National Health Service hospitals in the south of England within 3 months after loss. Hospitals ranged from large teaching hospitals with 7,000 births per year to smaller hospitals with under 2,000 births per year. Altogether they represented a birth population of 39,000 (around 6% of the UK birth population). Nearly all UK hospitals have bereavement midwives who care for women experiencing perinatal loss. These midwives were trained in study procedures and gave women an information pack and consent form, which they could sign and send back to opt in.

Information regarding the study was provided on the stillbirth and neonatal death society's (Sands) website (https://www.uk-**sands**.org). Women from anywhere in the UK could download and send a signed consent form to the study office.

Following signed consent, the study administrator made contact to arrange interview dates at 3 and 6 months post-stillbirth (+/- 1 week). Interviews were conducted by assistant psychologists who received training and supervision from the authors (AH, KMc). Most interviews were conducted in the participants' home but some by telephone; however, the exact numbers were not tracked. Main ethical approval was granted from the Oxfordshire research ethics committee (study number: 06/Q/605/15) and site specific approval for all sites was obtained.

Of the 138 mothers contacted by bereavement midwives and 12 recruited via the Sands website, 75 agreed to participate (50%), 8 dropped out of the study before the first interview, and 2 were excluded due to pregnancy. The final non-probability sample comprised 65 women. The mean age of participants was 31.92 (*SD* = 4.98 years. The majority self-identified their ethnic background as White UK (Caucasian and born within England, Scotland or Wales), were married, and worked full-time. The mean gestational age at stillbirth was 34.09 (*SD* = 5.95) weeks. For further demographic information and obstetric history of the sample see Table 1.

Measures

Research questions were addressed analyzing both clinician-rated and self-reported PTSD symptoms.

The *Structured Clinical Interview-DSM-IV-PTSD module* (SCID; First, Spitzer, Gibbon, & Williams, 1995) is a standardized diagnostic interview that was used to assess DSM-IV (APA, 1994) PTSD symptoms and history of trauma prior to stillbirth. Interviewers were trained in the use of the SCID.

The *Posttraumatic Diagnostic Scale* (PDS; Foa, 1995) is a self-report measure of PTSD symptoms (based on DSM-IV). Participants were asked to rate how often they experienced PTSD symptoms in relation to the stillbirth in the past month, using a 4-point frequency scale from 0 = not at all or only one time to 3 = 5 or more times a week / almost always. Cronbach's α for PDS total score at 3 and 6 months were .86 and .89.

The *Posttraumatic Cognitions Inventory* (PTCI; Foa, Ehlers, Clark, Tolin & Orsillo, 1999) is a 33-item questionnaire measuring negative cognitive appraisals of a trauma and its sequelae on three subscales: Negative Cognitions about Self, Negative Cognitions about the World, and Self-blame. Each statement was rated according to the extent of agreement ranging

from 1 = totally disagree to 7 = totally agree in relation to their stillbirth. Cronbach's α estimates for the PTCI-scales were .92, .83, and 83 respectively.

Participants completed the *Responses to Intrusions Questionnaire* (RIQ; Ehring, Frank & Ehlers, 2007), a17-item questionnaire, to report the use of dysfunctional cognitive strategies to manage intrusive memories of the stillbirth within the last week from 0 = never to 3 = always. It has good psychometric properties (Kleim, Ehlers & Gluckman, 2007). The RIQ comprises four subscales: Thought suppression, Rumination, Distraction, and Numbing. Participants rated the extent to which they utilised each of the strategies in the last week from 0 = never to 3 = always. Cronbach's α estimates for the RIQ-scales were .80, .69, .58, and .60 respectively.

The *Social Provisions Scale* (SPS; Russell & Cutrona, 1987) is a 24-item scale measuring perceived availability of social support at the most stressful time since stillbirth, comprising six subscales: Guidance, Reassurance of Worth, Social Integration, Attachment, Nurturance, and Reliable Alliance. The extent of agreement with each statement was rated from 1 = strongly disagree to 4 = strongly agree. The SPS has good validity and reliability (Russell, Cutrona, Rose & Yurko, 1984). The total social support index was utilized by averaging all items (α = .91).

Participants also completed a *demographic interview* in which they were asked about marital and employment status, ethnic origin, household income, and obstetric history.

Data Analysis

At 3 months, all participants completed the SCID. Five participants did not complete questionnaires at 3 months, but returned at 6 months. Further noncompliance with the study procedure at 3 months led to *n* = 5 (7.7%; SPS & RIQ), *n* = 6 (9.2%; PDS), and *n* = 19 (29.2%; PTCI) missing cases per scale. At 6 months, five subjects were unavailable (7.7% attrition rate).

Again, further noncompliance led to n = 6 (9.2%; SCID) and n = 10 (15.4%; PDS) missing cases. To handle such missing data properly, new missing data techniques such as normal-model multiple imputation (*MI*) were developed (Enders, 2011). MI assumes that the operating missingness mechanism is missing completely at random (*MCAR*) or missing at random. It performs well in small samples with large multiple regression models and up to 50% of missing data in the dependent variable (Graham, 2009) and was therefore the technique of choice. MI was implemented in three steps. First, variables related to missingness were identified. Several significant *t*-tests suggested that MCAR is unlikely to hold. To diminish estimation bias, variables found to be related to missingness or to be highly correlated with the variables containing missing data were included in the respective imputation models as auxiliary variables (Graham, 2012b). Second, MI was carried out with NORM 2.0 (Schafer, 1999). Due to the small sample size, small imputation models were needed. Imputation models for estimating Cronbach's α were run at item level; all other imputation models were at scale level. Imputing at item or scale level makes virtually no difference provided that all cases have either no data or all data for items making up a scale (Graham, 2012b). Separate imputation models were set up for separate analyses or research questions. Accordingly, MI estimates for the same parameter (e.g., lagged correlation for PDS) vary slightly across different models. The need for small imputation models prevented testing of the incremental value of different sets of predictors (cognitive predictors, risk factors, social support) in a single model. Analysis with NORM is typically done in the sequence of summary, Expectation-Maximization (*EM*) algorithm and data augmentation (DA) with imputation. Analyses that did not require standard errors (Cronbach's α, multiple *R*) were based on data imputed directly from EM parameters. The number of DA-steps was derived from the number of imputed data sets and the number of iterations it took EM to converge (for all models, EM normally converged in 122 to 184 iterations). Generating $m = 50$ imputed data sets

was deemed to be adequate (Graham, 2009). To ensure that the number of DA-steps was sufficient and the imputation solution acceptable, all MI diagnostic plots for means, variances and covariances were checked. For all realized imputation models, all MI diagnostic plots appeared in order.

Third, imputed data sets were analyzed in SPSS 20 using complete-cases procedures and pooling $m = 50$ parameter estimates and standard errors using SPSS 20 or MI automation utility (Graham, 2012a). For *t* tests and multiple regression analyses, multiple imputation degrees of freedom (df_{MI}) and fraction of missing information (*FMI*) were calculated. The *FMI* quantifies the proportion of the total sampling variance of a parameter estimate that is due to missing data (Enders, 2011). *FMI* rarely exceeded .30 in the present data. The df_{MI} do not directly depend on sample size. Large df_{MI} indicate stable MI estimates (small amounts of uncertainty of estimation due to missing data), and df_{MI} approaching m-1 indicate unstable MI estimates (Graham, 2012b). In the current study, all df_{MI} for paired *t*-tests ($812 \leq df_{MI} \leq 11{,}646$) and for regression coefficients ($320 \leq df_{MI} \leq 9{,}564$) suggested stabilized MI estimates. The $df_{MI,}$ however, clearly exceeded the *df* that would have resulted for complete data and may thus be considered as inappropriate for statistical inferences. We therefore utilized Barnard and Rubin's (1999, c.i. Enders, 2011) downwardly rounded adjusted degrees of freedom (df_{ad}), which never exceed the complete data *df*. Finally, to reduce multicollinearity in the lagged dependent variable regression models using negative appraisals as predictors, the PTCI scales were replaced by the PTCI total score.

Results

The first research question addressed mean level changes in PTSD symptoms from 3 to 6 months. Both number of clinician-reported and frequency of self-reported re-experiencing, avoidance, and arousal symptoms decreased significantly between 3 and 6 months. Table 2 shows descriptive statistics for maternal number of PTSD symptoms (SCID) and frequency of PTSD

symptoms (PDS) at 3 and 6 months after stillbirth. Estimates of the number (*n*) and frequency (%) of women who reached or exceeded thresholds for the DSM-IV re-experiencing, avoidance, and arousal criteria are based on complete cases for the SCID interview at 3 months ($N = 65$) and 6 months after stillbirth ($n = 59$).

The second research question referred to concurrent links between cognitive predictors and maternal PTSD symptoms. Table 3 shows the respective associations between PTSD symptoms and dysfunctional strategies (Model 1) and negative appraisals (Model 3) at 3 months. Dysfunctional strategies accounted for merely 5.1% of variance in the number of PTSD symptoms (Model 1). All four zero-order correlations and all four partial effects in the regression model remained nonsignificant suggesting that dysfunctional strategies and number of PTSD symptoms at 3 months were unrelated. Rumination and Numbing, however, correlated positively with the self-reported frequency of PTSD symptoms. When frequency of PTSD symptoms was regressed on concurrent dysfunctional strategies, 25.9% of variance in the PDS total score was explained and Rumination yielded a significant positive partial effect (Model 1). Thus, a greater tendency to ruminate was uniquely related to a greater frequency of self-reported PTSD symptoms. Given that the unstandardized regression coefficients reported for Model 1 and 3 are based on cross-sectional data, the reported effects represent associations, but not necessarily causal relationships.

Unlike dysfunctional strategies, negative appraisals accounted for substantial amounts of variance in both PTSD outcomes at 3 months (see Table 3, Model 3): Negative appraisals explained 42.2% of variance in number and 53.4% of variance in frequency of PTSD symptoms. Negative cognitions about the self and about the world contributed positively to the number and frequency of PTSD symptoms. Additionally, taking the positive effects of both negative

appraisals into account, higher scores in Self-blame were uniquely related to fewer PTSD symptoms.

The third research question addressed the capacity of the cognitive variables to predict change in PTSD symptoms (Table 3, Models 2,4).. The substantial lagged positive correlations for number and frequency of PTSD symptoms suggested a moderate to high level of rank order stability of PTSD symptoms over a period of 3 months. Dysfunctional strategies predicted change in the number of PTSD symptoms over time: When initial number of PTSD symptoms was taken into account, higher scores in Suppression and Distraction and lower scores in Numbing uniquely predicted a decline in the number of PTSD symptoms at 6 months post loss (Model 2). Dysfunctional strategies, however, did not alter the frequency of PTSD symptoms over time (Model 2). The capability of negative appraisals to model change in PTSD symptoms was negligible: Negative appraisals did neither uniquely predict change in the number nor in the frequency of PTSD symptoms (Model 4).

The final research question approached the relationships between risk factors and PTSD symptoms. Table 4 shows the correlations between number and frequency of PTSD symptoms at 3 and 6 months with perceived social support, demographic and obstetric history. The strongest negative associations were found between perceived social support and self-rated frequency of PTSD symptoms at 3 and 6 months. Changes in PTSD symptoms at 6 months due to social support, demographic and obstetric history variables were additionally tested in a series of exploratory lagged dependent variable regression analyses (not shown in Table 4). Beside the potential predictor of change, the analogous preceding PTSD score at 3 months was included in each model to account for baseline PTSD. Higher scores on perceived social support did not uniquely predict a decrease in the number of reexperiencing, avoidance, or arousal symptoms

(SCID) at 6 months (all $p = ns$). Mother's age uniquely predicted a decline in number of clinician-reported avoidance symptoms ($B = -.25$, $t = -2.02$, $df_{ad} = 54$, $p = .048$). Having more children ($B = -.32$, $t = -2.41$, $df_{ad} = 42$, $p = .021$) and more previous pregnancies ($B = -.31$, $t = -2.59$, $df_{ad} = 55$, $p = .012$) predicted less clinician-reported avoidance symptoms at 6 months. For self-reported frequency of PTSD symptoms, higher total scores in perceived social support ($B = -.26$, $t = -2.24$, $df_{ad} = 46$, $p = .030$) predicted a decline in re-experiencing symptoms, whereas higher income ($B = -.29$, $t = -2.67$, $df_{ad} = 51$, $p = .010$) predicted a significant decline in arousal symptoms.

Discussion

This study investigated cognitive predictors and risk factors of PTSD and its time course in mothers following stillbirth. PTSD symptoms were highest at 3 months, then significantly decreased at 6 months following stillbirth, although changes may not be linear. Results also showed a significant role of negative appraisals and dysfunctional strategies in predicting concurrent and time-lagged PTSD symptoms. Risk factors for postnatal PTSD were younger age, low income, and no previous pregnancies. Perceived social support was an important protective factor.

Our findings demonstrated that stillbirth can be experienced as a traumatic event and can result in clinical levels of maternal distress. DSM 5 Criterion A specifies that in order to develop PTSD, individuals must themselves be exposed to actual or threatened death, and that when learning of the death of a family member, the death must be violent or accidental. This could appear to exclude stillbirth; parents learn of the death of their baby in utero. All stillbirths, however, would certainly be perceived as accidental (and for parents whose baby dies due to a cord around the neck, the image of strangulation may be particularly haunting). For the majority,

PTSD symptoms were highest in the first few months and decreased between 3 and 6 months, as Jind (2003) found, although their second measurement point was more than one year following the loss.

When considering the associations between the cognitive factors and PTSD symptoms, it must be noted that PTSD was assessed using DSM-IV criteria. This is of relevance, as cognitive items are now part of the DSM 5 PTSD criteria. At 3 months, higher rumination was specifically related to more frequent self-reported symptoms. Although this has not previously been investigated in a stillbirth population, it is in line with other studies of traumatic loss (Morina, von Lersner & Prigerson, 2011). It has been argued that rumination is associated with avoiding aversive emotional experiences, preventing the elaboration and processing of the trauma memory (Lyubomirsky, Kasri, Chang & Chung, 2006).

Negative appraisals, particularly about self and world predicted PTSD symptoms at 3 months, which is comparable to findings in relation to traumatic childbirth (Ford et al., 2010). Working on these unhelpful appraisals is therefore crucial (Kleim et al., 2013). No causal relationship can be assumed, however, due to simultaneous measurement. Surprisingly, higher scores on Self blame uniquely predicted fewer clinician-rated PTSD symptoms, in contrast to another study (Jind, 2003). Further research is needed to examine more precisely the relationship between specific aspects of self-blame and PTSD symptoms.

Relationships between higher scores in suppression and distraction and lower scores in numbing and fewer PTSD symptoms (SCID) at 6 months were found. Therefore, after some time has passed, being able to suppress and distract oneself from memories of traumatic moments related to perinatal loss may be helpful, particularly in women of childbearing age who wish to

become pregnant again. In this population, suppression and distraction may be seen as adaptive, life affirming coping strategies. Our results may also be related to research showing that emotional avoidance during grief can be adaptive (Bonanno, Keltner, Holen & Horowitz, 1995) but replication is needed.

Focusing on risk factors, perceived social support was negatively associated with self-rated PTSD symptoms at both time points. Higher perceived social support scores also specifically predicted a decline in the self-reported frequency of re-experiencing symptoms, confirming its role as an important protective factor, as was found in a sample of parents up to 18 months after perinatal loss (Christiansen, Elklit & Olff, 2013) and in women 10 years after stillbirth (Crawley et al., 2013). It is possible, however, that PTSD symptoms may influence perceived social support and no causation can be assumed.

This has important social implications highlighting the crucial role that family, friends, and professionals have in providing support following stillbirth. Family members and friends often withdraw as they feel ill-equipped to provide support. It is also known that individuals begin to experience compassion fatigue after a relatively short time, with a sense that "she should be better now" prevailing. This can mean that the important protective qualities of social support are not fully utilised. Encouraging women and their families to work together on recovery could have the potential to improve outcome.

Furthermore, an inverse relationship between avoidance (SCID, PDS) at 6 months and mother's age was identified, which is in line with findings by Gravensteen et al. (2013). Additionally, new protective factors were found: higher household income, more living children, and higher number of previous pregnancies each predicted fewer avoidance symptoms.

This study has some limitations, particularly the non-probability sampling method, the small sample size, attrition, and substantial missing data. The latter also put a limit to the complexity of the imputation models and the analysis models. The sample comprised mainly White British, married women with a full-time job and an elevated household income, which makes generalizations to women of other ethnic and socioeconomic backgrounds difficult. Information on mothers' education would have been desirable. Additionally, only perceived availability of social support was measured. Both measurement points took place early after stillbirth and conclusions beyond the first six months cannot be drawn. History of trauma was only assessed with the SCID. Furthermore, no causal interpretations are possible for results drawing solely on variables measured at the same time points. Finally, changes in symptoms may not be linear. Thus, the gradient of change between the third and sixth month post loss cannot be linearly extrapolated to later points in time. The strengths of this study are the use of both self-report and structured clinical interview measures for assessing PTSD symptoms. Furthermore, the sample comprised a "pure" stillbirth population, thus specifically focusing on the psychological impact of late perinatal loss.

In conclusion, knowledge of the trajectory and cognitive predictors as well as risk factors of mothers' PTSD symptoms may inform the development of a screening instrument to identify mothers at risk of developing mental health problems. A subgroup of mothers might be especially at risk: younger mothers from a lower socioeconomic background with no previous pregnancies. Our results indicate that cognitive behavioural techniques should be an important component for mothers seeking help for clinical levels of PTSD following stillbirth, and these should mainly be aimed at targeting negative cognitive appraisals pertaining to the self and the world, and

dysfunctional strategies, particularly rumination. Women's social networks need to increase their support following stillbirth.

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Table 1

Demographic Characteristics and Obstetric History of the Sample

Variable	*n* or *M*	% or *SD*
Age in years[1] ()	31.92	4.98
Number of living children	0.51	0.81
Current psychotropic medication	4	6.2
Ethnic origin		
White UK	56	86.2
White other	5	7.7
Other (Black African, Pakistani, other)	4	6.2
Relationship status		
Single	4	6.2
Living with partner	21	32.3
Married	40	61.5
Employment status		
Full-time	38	58.5
Part-time	14	21.5
Unemployed	5	7.7
Homemaker	8	12.3
Average household income in £		
0–19.999	9	13.8
20.000–29.999	9	13.8
30.000–39.999	11	16.9

40.000–49.999	13	20.0
50.000+	23	35.4
Gestational weeks at stillbirth[2] ()	34.09	5.95
Number of previous pregnancies	2.15	1.41
Number of previous perinatal losses	0.38	0.80
History of perinatal loss before stillbirth	16	24.6
Last pregnancy was planned	46	70.8
Vaginal birth	21	35.0
Planned cesarian section	39	65.0

[1]n = 51; [2]n = 61

Table 2

Descriptive Statistics for Maternal PTSD at 3 and 6 Months after Stillbirth and Paired t-Tests for Mean Level Changes

	3 months				6 months						
Variable	M_{EM}	SD_{EM}	*n*	%	M_{EM}	SD_{EM}	*n*	%	*t*	df_{ad}	FMI
Number of SCID Symptoms											
Reexperiencing[a]	1.95	1.29	56	86.2	1.47	1.33	45	69.5	2.42*	55	.09
Avoidance[b]	2.05	1.68	23	35.4	1.50	1.52	13	22.0	2.34*	57	.06
Arousal[c]	2.12	1.54	36	55.4	1.45	1.22	29	49.2	3.35**	58	.06
Frequency of PDS Symptoms											
Reexperiencing	5.08	3.16			3.61	3.03			2.99**	50	.16
Avoidance	6.55	4.52			4.33	3.85			4.23***	47	.21
Arousal	4.82	2.99			3.53	3.23			3.22**	45	.23

Note. M_{EM} & SD_{EM} = maximum-likelihood estimates for *M* and *SD* based on the EM covariance matrix generated with NORM (Schafer, 1999). *FMI* = fraction of missing information; df_{ad} = adjusted multiple imputation degrees of freedom; *t*-tests, df_{ad} and *p*-levels calculated from combined $m = 50$ imputed data sets (imputations were done from $N = 65$). MI was carried out at scale level with auxiliary variables. [a]Number and frequency = those who reported at least one symptom. [b]Number and frequency = those who reported at least three symptoms. [c]Number and frequency = those who reported at least two symptoms.

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

Table 3

Pearson Correlations and Multiple Regression Models for Concurrent and Lagged Relationships of Number and Frequency of PTSD Symptoms at 3 and 6 Months and Cognitive Variables at 3 Months after Stillbirth

	Number of PTSD symptoms (SCID)					Frequency of PTSD symptoms (PDS)				
Variable	*r*	*B*	*t*	df_{ad}	FMI	*r*	*B*	*t*	df_{ad}	FMI
Model 1: Dysfunctional Strategies and PTSD Symptoms at 3 Months										
Suppression	.02	.02	0.11	53	.08	.08	-.01	-0.11	51	.10
Rumination	.19	.17	1.23	53	.08	.48***	.45	3.63***	50	.12
Numbing	.03	-.04	-0.27	52	.08	.28*	.20	1.42	44	.20
Distraction	.13	.09	0.63	53	.07	.15	-.03	-0.24	49	.13
Model 2: Dysfunctional Strategies at 3 Months and PTSD Symptoms at 6 Months										
PTSD-Symptoms	.40**	.41	3.47**	45	.18	.59***	.55	3.96***	40	.26
Suppression	-.26	-.33	-2.61*	51	.08	-.02	-.13	-0.96	38	.28
Rumination	.19	.14	1.18	52	.08	.29*	.01	0.05	45	.18
Numbing	.11	.30	2.27*	48	.14	.25	.16	1.17	41	.24
Distraction	-.20	-.28	-2.33*	51	.08	.06	-.03	-0.21	32	.37
Model 3: Negative Appraisals and PTSD Symptoms at 3 Months										
Negative Self-view	.44***	.48	2.42*	45	.20	.59***	.46	2.39*	43	.23
Neg. World view	.54***	.44	2.91**	45	.20	.62***	.40	2.67**	42	.25

Self-blame	.13	-.45	-2.35*	33	.38	.36***	-.18	-1.03	36	.33
Model 4: Negative appraisals at 3 months and PTSD symptoms at 6 months										
PTSD Symptoms	.44***	.39	2.89**	53	.10	.61***	.57	3.96***	44	.22
PTCI Total Score	.28*	.11	0.81	51	.13	.43**	.08	0.53	40	.29

Notes: R^2 = variance explained was calculated with a single data set imputed directly from EM parameters; R^2 for Model 1 = .05 (SCID) and .26 (PDS); R^2 for Model 2 = .37 (SCID) and .41 (PDS); R^2 for Model 3 = .42 (SCID) and .53 (PDS); R^2 for Model 4 = .21 (SCID) and .35 (PDS); Pearson's *r*, standardized coefficients *B*, *t*-tests, adjusted multiple imputation *df* (df_{ad}) and fraction of missing information (*FMI*) were derived from combined $m = 50$ imputed data sets (imputations were done from $N = 65$). MI was done at scale level with auxiliary variables.

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

Table 4

Correlations of Study Variables at 3 Months with Number and Frequency of PTSD Symptoms at 3 and 6 Months

	Number of PTSD symptoms (SCID)						Frequency of PTSD symptoms (PDS)					
	3 months			6 months			3 months			6 months		
Variable	RE	AVD	ARSL	RE	AVD	ARSL	RE	AVD	ARSL	RE	AVD	ARSL
Social Support	-.18	-.29*	-.25*	-.21	-.25	-.22	-.23	-.48***	-.45***	-.32*	-.34*	-.49***
Age at Stillbirth	-.21	-.12	.07	-.15	-.28*	-.10	-.20	-.24	-.23	-.24	-.30*	-.31*
Income per Year	.01	-.12	-.13	.08	-.02	-.13	.09	-.05	-.15	-.15	-.12	-.36**
No. of Living Children	-.14	-.13	.18	-.22	-.36**	.06	-.15	-.10	-.06	.01	-.12	.14
History of Trauma	.07	.10	.18	-.17	-.17	-.07	.07	.17	.18	.11	.09	.15
No. of Pregnancies	-.19	-.18	.22	-.22	-.36**	.11	-.11	-.19	-.01	.11	-.04	.20
History of Perinatal Loss	-.01	-.29*	-.05	.07	-.11	.07	-.13	-.15	-.03	.04	-.04	.02
No. Previous Perin. Losses	-.12	-.25*	.08	-.12	-.18	-.00	-.19	-.23	-.06	-.02	-.14	-.07
Pregnancy Planned	.11	-.08	.01	.11	-.11	-.03	.08	-.04	-.10	.02	-.02	-.08
Weeks of Gestation	.17	-.11	-.18	.09	.08	-.04	-.04	-.17	-.32*	-.13	.08	-.05
Mode of Delivery	-.08	-.17	-.01	-.04	-.10	-.05	-.14	.05	-.05	.04	-.12	-.12

Note. RE = reexperiencing symptoms; AVD = avoidance symptoms; ARSL = arousal symptoms. Correlations *r* derived from combined *m* = 50 imputed data sets (imputations were done from *N* = 65).

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$ (2-tailed).