THE RELATIONSHIPS AMONG COPING STRATEGIES, GRIEF SEVERITY, AND BLOOD PRESSURE IN WIDOWS AND WIDowers

By

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Abstract

Bereaved individuals’ grief severity and physiological outcomes can greatly affect overall functioning and health. The coping strategies individuals employ during bereavement have been shown to significantly affect widows’ and widowers’ adjustment. Coping strategies can be understood in three categories: Trauma Focus (TF), Forward Focus (FF), and Flexibility; which encompasses oscillations between TF and FF. The aim of the study was to explore the effects of these coping strategies on grief severity and resting blood pressure in widows and widowers. It was predicted that individuals who demonstrated higher Flexibility and higher FF would have lower grief severity. Also, individuals who demonstrated higher Flexibility and higher FF would have lower blood pressure relative to those who score lower in Flexibility and higher in reported TF. Two to three resting blood pressure measurements were taken on the same day. Cross sectional regression analyses were performed. Results indicate a negative relationship between coping Flexibility and grief severity in support of the first hypothesis. However, the results do not indicate a significant relationship between coping strategies and blood pressure, disconfirming the second hypothesis. Further investigation would be of interest to guide bereaved individuals’ coping strategies to potentially decrease grief severity.
The Relationships among Coping Strategies, Grief Severity, and Blood Pressure in Widows and Widowers

Bereavement is a profound hardship that affects approximately eight million people in the United States every year (National Mental Health Association, 2015). Early grief is a vulnerable time that can result in health issues due to adverse psychological responses in conjunction with adverse physiological reactions. For example, recently bereaved people can experience increased cortisol, decreased immune function, increased inflammation, and increased heart rate and blood pressure (Buckley et al., 2012). Within the first six months of loss, widowers have a 40% increase in mortality rate in comparison to their married counterparts (Buckley et al., 2012).

Many bereaved people can effectively cope and their grief decreases with time; however approximately two to three percent of people globally develop Complicated Grief (CG) (Shear, 2015). CG is severe grief after the loss of a loved one and results in functional impairment. It is recognized in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as “Prolonged Complex Bereavement Disorder”, and it is classified as a disorder for further study (American Psychiatric Association, 2013). Moreover, CG is distinguishable from depression (Shear, 2015). The symptoms of CG include intense yearning, disbelief or shock of the loss, and preoccupying thoughts about the lost loved one.

Furthermore, loss of a spouse can increase mortality rates due to cancer, coronary heart disease, cardiovascular disease, or accidents (Hart, Hole, Lawlor, Smith, &Lever, 2007). Of the increased mortality rates in bereaved people, approximately 20% to 53% of the deaths are due to cardiovascular disease. Because blood pressure is one of the main indicators (along with heart rate) of future cardiovascular disease (Buckley et al., 2011), blood pressure is a main outcome observed in the present study. Blood pressure variability is greatest in the first 6 months of
bereavement (Mihailidou et al., 2011). On average, the bereaved spouses’ blood pressure decreases over the course of four years (Buckley et al., 2012). Because elevated blood pressure may persist in the bereavement process, the present study recruited spouses bereaved within the six month to four year period.

People develop coping strategies to deal with trauma and adverse events. Past research indicates focusing on the thoughts and memories of distress is a coping mechanism that allows people to work through the trauma (Horowitz, 1986). Due to the emphasis on the trauma, this coping strategy can be referred to as Trauma Focus (TF). However, more recent research indicates the value of focusing beyond the trauma and practicing emotional avoidance in some situations, as one of several coping strategies (Bonanno, Keltner, Holen, & Horowitz, 1995); this coping strategy can be referred to as Forward Focus (FF) due to the emphasis on the future. Coping flexibility encompasses a combination of TF and FF coping strategies. Although seemingly contradictory, oscillations between these coping strategies have suggested trauma moderation by allowing people to engage in different coping mechanisms as needed (Bonanno, Pat-Horenczyk, & Noll, 2011). Past research has demonstrated the importance of which coping strategies are employed, as well as the survivor’s ability to assess the effectiveness of the different coping strategies for psychological adjustment. In recognizing the level of effectiveness for each strategy, one can modify the strategies accordingly, depending on the situation (Bonanno & Burton, 2013). Flexibility provides oscillations among coping strategies so that TF and FF coping strategies are not presumptuously and universally categorized as maladaptive or adaptive coping strategies, respectively.

In a long term study with college students in New York City after the terrorist attacks on September 11th, Bonanno and colleagues (2004) demonstrated the benefits of flexibility, in lieu
of a dominant FF or TF score. Moreover, Burton and colleagues (2012) calculated TF, FF, and Flexibility scores for bereaved and married people in Hong Kong and the United States. Overall, the bereaved people had higher TF scores than the married people in both countries. Also, people with CG had lower FF scores and lower Flexibility scores than married people and bereaved people with less grief severity. Therefore, the study indicates that flexibility of coping strategies was associated with fewer bereavement symptoms. Furthermore, the findings were consistent across cultures (Burton et al., 2012).

The objective of the study was to examine the relationships among coping strategies, grief severity, and blood pressure following bereavement. The first hypothesis predicted that if participants demonstrate Flexibility and/or report higher Forward Focus (FF) coping strategies, they will have lower grief severity compared to those who are less flexible in their coping strategies or report greater use of Trauma Focus (TF) coping strategies. The second hypothesis predicts that if participants demonstrate higher Flexibility and/or report higher Forward Focus (FF) coping strategies, they will have lower blood pressure measurements than those who are less flexible in their coping strategies or report greater use of Trauma Focus (TF) coping strategies.

**Methods**

**Procedures**

All procedures were approved by the Institutional Review Board at the University of Arizona. Participants were recruited via flyers and mailings based upon recent losses listed in the local public obituaries. All of the participants had lost a spouse or romantic partner within the past six months to four years and were between 18 and 85 years old. The study took place within the Grief, Loss, and Social Stress (GLASS) lab and was a part of a larger study investigating the
efficacy of Mindfulness Meditation (MM) training to improve grief outcomes (Knowles, 2015). Therefore, participants undergoing individual therapy, group therapy, and/or a bereavement support group were also excluded from the present study.

The Inventory of Complicated Grief (ICG-R) is a 17-item, reliable self-assessment that can indicate CG and the severity of grief. Example items include rating “I feel myself longing and yearning for _____” and “I feel like I have become numb or detached since the death of _____” on a scale of 1 (no sense) to 5 (an overwhelming sense). The lowest possible score on the ICG-R is a 17, while the highest score is 83. To be considered clinically significant, an individual must score greater than 25 on the ICG-R (Prigerson et al., 1995). For accuracy, the ICG-R should be taken more than 6 months after the loss of a loved one (Shear, 2015). In the present study, the ICG-R provides an accurate self-assessed measure of participants’ grief severity.

The 20-item Perceived Ability to Cope with Trauma (PACT) was created by Bonanno and colleagues (2011) to measure one’s self-assessment of using TF and FF coping strategies; scoring ranges from 20 to 140. Sample questions from the PACT are “Face the grim reality head on” and “Distract myself to keep from thinking about the event” on a scale of 1 (not at all able) to 7 (extremely able). The oscillations between the two coping strategy types can be assessed via the Flexibility score. Greater FF and TF scores produce greater Flexibility scores.

Throughout the larger study, participants completed questionnaires to self-assess their grief severity, yearning, grief-specific rumination, coping strategies, and other potential stressors in the context of their lives. The ICG-R and PACT baseline questionnaires were therefore pulled from the larger study for the purpose of the present investigation.
If participants met the inclusion criteria, they were sent a consent form via email or mail, based on preference. In addition, participants were emailed a link through which they completed the baseline questionnaire via Qualtrics (Online Survey Software, 2014).

During the lab visit, participants were told that grief encompasses both mental and physical components and that the lab visit would focus on the physical elements. Because the present study was conducted within the context of a larger study, the whole lab visit took about an hour and consisted of various physiological measurements (e.g. heart rate, blood pressure). Resting blood pressure was measured two to three times. An automated Microlife® blood pressure cuff was used. Participants were asked for arm dominance so the blood pressure reading could be taken from the non-dominant arm. If participants were ambidextrous, they were asked which arm their blood pressure was normally taken from when visiting a clinician. All participants’ blood pressure readings were taken from the same chair in the private lab room in an attempt to control for environmental variables. The first and second blood pressure readings were sequential. If either of the systolic readings was higher than 140 mmHg or if there was a difference greater than or equal to 4 mmHg between the first two systolic and/or diastolic readings, then a third blood pressure reading was taken after a short computer task, which was a part of the larger study’s protocol. Thus, the third blood pressure measurement, if needed, was consistently taken approximately twenty minutes later.

Moreover, participants were consistently asked to not cross their legs during blood pressure measurements as a form of standardization. However, sometimes participants would inadvertently cross their ankles during a measurement. Nonetheless, past research has shown crossed ankles should not significantly affect blood pressure measurements; instead, legs crossed
at the knee would significantly skew the measurements (Tosun et al., 2005), which was effectively avoided.

**Measures and Data Analysis**

Data were analyzed using SPSS (Version 23). Participants’ coping strategies were evaluated based upon PACT FF, TF, and Flexibility scores. The ICG-R score was calculated by summing all of the scores (Prigerson et al., 1995). The PACT FF and TF were calculated as standardized scores. Then, a polarity score was calculated by taking the absolute value of the difference between FF and TF. To achieve the overall Flexibility score, the polarity score was calculated from the sum of FF and TF (Bonanno et al., 2011). Systolic and diastolic blood pressure measurements for each participant were averaged across a participant’s total number of measurements.

Regression analyses were performed to test whether higher FF, TF, and Flexibility coping strategies related to lower grief severity and lower blood pressure. More specifically, the first hypothesis was tested with a regression model in which FF, TF, and Flexibility predicted grief severity (measured via ICG-R scores). A second model was run with length of bereavement (in months) included to account for this potential confound. For the second hypothesis, FF, TF, and Flexibility were regressed on diastolic and systolic blood pressure.

**Results**

Thirty-six adults participated in the study (mean age = 66.16, SD = 7.93). However, blood pressure measurements were only recorded for thirty-three of the adults due to cuff size limitations and participants who dropped out of the study before the baseline lab visit due to personal circumstances. Demographic statistics are provided in Table 1.
Table 1: Demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean/N</th>
<th>SD/%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>66.16</td>
<td>7.93</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>27</td>
<td>75%</td>
</tr>
<tr>
<td>BMI</td>
<td>27.75</td>
<td>5.70</td>
</tr>
<tr>
<td>Education (Bachelor’s degree or higher)</td>
<td>25</td>
<td>70%</td>
</tr>
<tr>
<td>Length of bereavement (months)</td>
<td>15.39</td>
<td>6.57</td>
</tr>
</tbody>
</table>

The results for the first model demonstrated a significant relationship between coping strategies and grief severity ($r = 0.527, p = 0.014$). Further analysis showed that Flexibility and Forward Focus coping strategies were negatively related with grief severity, which supports the first hypothesis; as reported values of coping Flexibility increased, grief severity decreased (see Figure 1). As seen in Figure 2, increased Forward Focus coping strategies related to a decrease in grief severity. On the other hand, as predicted, increased Trauma Focus coping did not lower grief severity.
Figure 1: Negative Relationship between coping Flexibility and Grief Severity
Results remained significant after controlling for age, gender, and education. However, when length of bereavement (in months) was added to the model to predict grief severity, coping Flexibility became statistically insignificant and Forward Focus became less significant (only $p = 0.06$). Therefore, coping strategies and length of bereavement were predictors for grief severity in this sample (refer to Table 2).
Table 2: Unstandardized regression coefficients testing predictions on outcomes of grief severity (ICG-R), systolic and diastolic blood pressure from FF, TF, and Flexibility in Coping Strategies

<table>
<thead>
<tr>
<th>Variable</th>
<th>ICG-R</th>
<th></th>
<th>SBP</th>
<th></th>
<th>DBP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>SE</td>
<td>β</td>
<td>SE</td>
<td>β</td>
<td>SE</td>
</tr>
<tr>
<td>Forward Focus (FF)</td>
<td>-1.180</td>
<td>0.002*</td>
<td>0.122</td>
<td>8.784</td>
<td>-0.372</td>
<td>5.343</td>
</tr>
<tr>
<td>Trauma Focus (TF)</td>
<td>0.016</td>
<td>0.001</td>
<td>-0.143</td>
<td>6.259</td>
<td>0.218</td>
<td>3.807</td>
</tr>
<tr>
<td>Flexibility</td>
<td>-0.823</td>
<td>0.001</td>
<td>0.204</td>
<td>5.980</td>
<td>0.287</td>
<td>3.637</td>
</tr>
<tr>
<td>Length of Bereavement</td>
<td>-0.297</td>
<td>0.345</td>
<td>-0.044</td>
<td>0.409</td>
<td>0.106</td>
<td>0.290</td>
</tr>
<tr>
<td>*R²</td>
<td>0.277</td>
<td></td>
<td>0.061</td>
<td></td>
<td>0.078</td>
<td></td>
</tr>
<tr>
<td>*F</td>
<td>4.096*</td>
<td></td>
<td>0.629</td>
<td></td>
<td>0.819</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05

Systolic blood pressure was not predicted by PACT Flexibility, FF, and TF coping strategies in a regression model (r = 0.247, p = 0.602). Similarly, when PACT Flexibility, FF, and TF were regressed on diastolic blood pressure, there was a nonsignificant relationship (r = 0.280, p = 0.494), contrary to the above hypotheses. Table 2 details both models. After controlling for age, gender, BMI, and length of bereavement, the results remained nonsignificant.

**Discussion**

The present study investigated whether TF and FF coping and coping Flexibility predict grief severity and blood pressure. In regards to the first hypothesis, the results supported a statistically-significant relationship between increased Flexibility, FF coping strategies, length of bereavement, and lower grief severity. For the second hypothesis, there was no significant relationship between coping strategies and blood pressure. Past research demonstrates FF and
Flexibility coping strategies significantly predict grief severity as well as lower loneliness, perceived stress, and yearning (Knowles & O’Connor, 2015). Moreover, greater FF and flexibility coping strategies appeared to have greater positive effects when employed early in bereavement (Knowles & O’Connor, 2015).

Due to the small sample size, the results of the study may not fully generalize. To test these potential limitations, retrospective power analyses were performed (GPower 3.1). For the first hypothesis, post hoc power analyses for a sample size of 36 people and 4 predictors revealed power of 0.08 to detect a small effect (effect size $f^2 = 0.02$), power of 0.37 to detect a medium effect (effect size $f^2 = 0.15$), and power of 0.75 to detect a large effect (effect size $f^2 = 0.35$). For reference, the critical F value for all 3 effect sizes was 2.68; the reported F value of 4.096 therefore meets the critical F value. Provided the relationships among coping strategies, length of bereavement, and grief severity are medium to large effects, the present study has enough to power to detect these relationships.

For the second hypothesis, retrospective power analyses for a sample size of 33 participants and 3 predictors revealed power of 0.09 to detect a small effect, 0.39 to detect a medium effect, and 0.77 to detect a large effect. The critical F value was 2.93 for all 3 effect sizes, but the F values in the present study were below 1 for systolic and diastolic blood pressure (0.629 and 0.819, respectively). If the relationships among coping strategies and systolic and diastolic blood pressure had medium to large effects, the present study should have had enough power to detect these relationships. On the other hand, because the power to detect small effects was low, small effects among the variables may not have been recognizable.

Also, because participation was voluntary through flyers and mailing recruitments, the sample of participants may not represent the population as a whole. Moreover, participants were
recruited within the context of the Mindfulness Meditation (MM) training study under which the present study was conducted; thus, although the data used was collected prior to MM training, those who chose to participate may have had predisposed ideas about meditation practices that could have influenced their participation. Perhaps those who are open to mindfulness intervention may be different than the larger populations of widows and widowers.

In regards to the first hypothesis, it would be of interest to control for other major life stressors, because feelings of grief outside the loss of the romantic partner could affect participant self-assessment scores. Regarding gender, a past study indicated there is no difference between Traumatic Grief scores for males and females who have lost a spouse (Boelen & van den Bout, 2003). Similarly, the results of the present study were not significantly affected by gender in regards to predicting grief severity. Although results did not indicate age had predictive value for grief severity, age may still be a significant factor to consider because bereaved adults who are older generally experience less severe grief symptoms over a shorter time period in comparison to younger bereaved adults (Lichtenstein, Gatz, Pedersen, Berg, & McClearn, 1996; Nolen-Hoeksema & Ahrens, 2002; Sherbourne, Sherbourne, Meredith, Rogers, & Ware, 1992; Zisook, Shuchter, Sledge, & Mulvihill, 1993).

Because the present study was conducted post-death of a loved one, another limitation would be the inability to estimate anticipatory grief and functioning before the loss of the loved one (Safer, Bonanno, & Field, 2001). Therefore, the full picture of grief severity may not be captured. Some people may experience depression prior to the loss that can contribute to chronic depression more than to chronic grief (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). Of note, past research indicates whether or not the death of the loved one was expected or not does not predict grief severity (Knowles & O’Connor, 2015).
Moreover, the reasons behind why some individuals do not display grief symptoms can vary, including denial, poor attachment to the deceased, or resiliency (Bonanno, Papa, & O’Neill, 2001). Unfortunately, these reasons are quite different and the present study only measured the grief, not the reasons behind the grief (or lack thereof). Some people may display absence of grief because they had a romantic partner with a chronic, serious illness or other high stresses in their marriage, in which case depression could have decreased after the romantic partner’s death (Bodnar & Kielcolt-Glaser, 1994; Cohen & Eisdorfer, 1988; Horowitz, 1985). Another area of growth could be to incorporate data for non-bereaved people in order to serve as a control group in comparison to the widows and widowers. For those who are bereaved, the specifics of their loss (i.e. level of closeness to deceased, level of acceptance of the loss, and pre-loss health of the loved one) could be accounted for in an attempt to bypass the limitations behind why participants report their grief symptoms (or lack thereof) as they do.

Similarly to the first hypothesis, other major life stressors could be accounted for in future studies in regards to the second hypothesis. Other confounding factors and stressors, such as socioeconomic status or major life changes, could be considered as these may also affect grief severity and blood pressure measurements. Moreover, past studies have broken age into decade categories (i.e. 20-29, 30-39, 40-49, etc.) to account for changes in blood pressure with age, which could be applied in future studies. Generally, past studies indicated an increase in blood pressure as adults increase in age and/or in BMI (Peres, Tsakos, Barbato, Silva, & Peres 2012), which supports why these confounding variables were controlled for in the present study; although they did not appear to have any predictive value.

Adults who have hypertension, adults who are taking medications for hypertension, and adults who are taking medications that can affect blood pressure could be excluded in future
studies examining blood pressure. Hypertension can be defined as an individual with systolic blood pressure equal to or greater than 140 mmHg or diastolic pressure equal to or greater than 90 mmHg (Chobanian et al., 2003). However, it is noteworthy that in 2014 the Joint National Committee updated blood pressure guidelines for adults 60 years old or older to have systolic readings less than 150 mmHg, while guidelines for diastolic were to remain under 90 mmHg (Nursing Home and Elder Business Week, 2015).

Because the participants came into the GLASS lab for their measurements, they may have had elevated blood pressure readings due to anxiety with the visit. This could be similar to the “white coat effect”, which past studies have defined as elevated blood pressure when the measurement is taken by a clinician. Interestingly, women tend to be affected by the “white coat effect” more frequently and significantly, which is another reason why gender may be an important factor to be considered (Myers & Reeves, 1995).

Also, future studies may want to consider taking blood pressure at the same time of day for each participant, because past studies have noted blood pressure fluctuates throughout the day (Bulpitt et al., 2013). Furthermore, each participant could have been asked what they think their “normal” blood pressure is, and then this could have been compared to their recorded blood pressure measurements. Additionally, some participants in the study would begin talking during the blood pressure recordings; past research demonstrates significant changes in systolic and diastolic measurements when people talk (about a 5.3 mmHg and 6.2 mmHg increase, respectively) (Zheng, Giovannini, & Murray, 2012). If the participant was wearing a sweater, they were asked to remove it. However, some participants wore thin long sleeve shirts, in which case future studies may want to account for potential blood pressure changes with long sleeves, as well.
Although the results do not indicate a significant relationship between coping strategies and blood pressure, applying the considerations for future investigation could potentially detect small effects between the variables. Thus, the directionality among coping strategies, grief severity, and blood pressure relationships would be interesting to investigate further. The effects of the mind modulating nervous system input via memory and thought can be referred to as top-down processing. On the other hand, the effects of the sensory, visceral, and skeletal inputs on the brain and limbic system can be referred to as bottom-up processing (A. Baldwin, PSIO 415 Physiology of Mind-Body Interactions, January 13, 2016). By assessing these processes, the directionality between grief severity and physiological outcomes could be deciphered further; for example, whether severe cognitive grief leads to higher blood pressure or whether high blood pressure can lead to more severe cognitive grief.

Considering the study’s areas for growth, future research could be modeled similarly to further investigate coping strategies, grief severity, and physiological outcomes (such as blood pressure). Despite a lack of a relationship between grief severity and blood pressure in the study, understanding the potential relationship between the two may be of interest to investigate further for older individuals specifically. For instance, a decrease of 2 mmHg in mean systolic blood pressure has been linked with 7% decrease for cardiovascular disease and 10% decrease in risk of stroke and death. Thus, blood pressure may be a key target for preventative plans in bereaved individuals (Buckley et al., 2012). Regardless, the trend between Flexibility and/or FF coping strategies and less severe grief can be applied in a clinical setting to increase efficiency of care for clients. Thus, the present study is of interest for future approaches to grief intervention. More specifically, bereaved individuals could be taught how to implement each coping strategy as well as explore when each strategy would be most appropriate to implement. In doing so, the grief
severity of the bereaved individuals could decrease with an increase in Flexibility and/or FF coping strategies.
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