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An Ecosystems and Vulnerable Populations Perspective on Solastalgia and Psychological Distress After a Wildfire

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ABSTRACT

We studied the relationship between psychological distress and relative resource and risk predictors, including loss of solace from the landscape (solastalgia), one year after the Wallow Fire, in Arizona, United States. Solastalgia refers to the distress caused by damage to the surrounding natural environment and it has not been examined for its relationship to psychological health. Doing so opens avenues of research that inquire into how land management might be able to support improved community resilience and psychological health outcomes after a wildfire. In 2012, we conducted a household survey mailed to all 1,387 households in the five communities surrounding the fire. The Kessler Psychological Distress Scale (K10) assessed psychological distress. In the multivariate analysis, higher solastalgia score and an adverse financial impact of the fire were associated with clinically significant psychological distress. Annual household income $\geq$ $80,000 and a higher family functioning score were associated with less psychological distress. Part-time residents were no more likely to have psychological distress than full-time residents. We conclude that dramatic transformation of a landscape by an environmental event such as a wildfire can reduce its value as a source of solace. These results call for novel post-wildfire community recovery interventions that wed forest management and community psychology.

AN ECOSYSTEMS AND VULNERABLE POPULATIONS PERSPECTIVE ON SOLASTALGIA AND PSYCHOLOGICAL DISTRESS AFTER A WILDFIRE

INTRODUCTION AND PURPOSE

As societal losses to natural disasters and environmental hazards increase as a result of climate change, concern has grown about the associated health costs (Knowlton, Rotkin-Ellman, Geballe, Max, & Solomon, 2011). Wildfire is likely to increase in frequency and severity, in part due to past management practices and in part due to climate change, which is expected to lead to longer and more severe fire seasons (Westerling, Hidalgo, Cayan, & Swetnam, 2006). Wildfires are also likely to have increasing social impacts as more people move into the wildland-urban interface where homes are built proximate to wildland vegetation (Theobald and Romme, 2007). This increased human exposure to wildfire potentially has direct implications for human health. Although smoke is generally seen as the most significant health impact, given that wildfires can be quite stressful events they also may have psychological health consequences. Understanding the psychological effects of wildfires, who in the community is most at risk, and the factors associated with poor psychological outcomes, will be important for identifying the most effective ways to minimize negative health outcomes and associated costs from wildfires. This information may be of particular importance for people in rural areas where mental health services are often limited (Wang et al., 2005).

Experiencing a fire can be highly stressful (Grievink et al., 2007; Jenkins, Hsu, Sauer, Hsieh, & Kirsch, 2009) but there is a paucity of research examining factors associated with psychological distress in representative community samples. The few studies that do look at psychological outcomes focus on specific groups including college students, children and adolescents, mental health services clients, and firefighters(Bryant & Harvey, 1996; McDermott, Lee, Judd, & Gibbon, 2005; McFarlane, 1987; Scher & Ellwanger, 2009; Tally, Levack, Sarkin, Gilmer, & Groessl, 2013). For instance, Marshall et al. (Marshall, Schell, Elliott, Rayburn, & Jaycox, 2007) estimated the prevalence of mental disorders among help-seeking individuals after California wildfires in 2003 and found that property damage, life endangerment, and physical injury were the best predictors of mental health. However, little research has examined how wildfires may affect health outcomes for the general population and how particular fire stresses, such as the risks involved in defending one's home and negative impacts on property or finances, may affect outcomes.

Assessing the impact of wildfires on human health and well-being can be informed by an "ecosystem health" framework which looks to understand the links between human health and disturbances in the surrounding ecosystem(de Freitas, de Oliveira, Schutz, Freitas, & Camponovo, 2007; Forget & Sanchez-Bain, 1999; Nielsen, 2001; Rapport, 1999; Webb et al., 2010). Within this model, human beings influence and are influenced by the surrounding biophysical environment, along with social, economic, behavioral

and genetic factors: changes to the surrounding ecosystem may impair the numerous functions supporting well-being. Numerous studies connect the health of the surrounding ecosystem to human health, including psychological health (Elliott et al., 1993). In particular, studies have documented the distress that accrues from the emotional impact of gradual environmental degradation (Sartore, Kelly, Stain, Albrecht, & Higginbotham, 2008). A study linking dryland salinity in Western Australia with hospital admission records found that hospitalizations for depression were higher in areas that were more affected by dryland salinity (Speldewinde, Cook, Davies, & Weinstein, 2009). A proposed mechanism for this was the loss of income among affected farmers, though this was not directly assessed. Another study documented that depression symptoms were more prevalent in Central Appalachian areas characterized by mountaintop removal coal mining compared to areas where other forms of mining or no mining were practiced. Income, education, and marital status only partially accounted for the depression risk (Hendryx & Innes-Wimsatt, 2013).

The psychological dimension of this connection between nature and human health may be explained by the concept of “solastalgia”. Solastalgia, meaning loss of solace, is not a new mental illness but rather is a term that refers to the distress caused by environmental change. Solastalgia has been proposed as one potential human response when the physical landscape is transformed and stripped of its capacity to provide solace (Albrecht et al., 2007). Higginbotham measured solastalgia among residents of open pit coal-mining areas in Australia and found that a stronger sense of

distress was expressed by those in more highly degraded areas (Higginbotham 2007). The authors of the Central Appalachia study speculated that solastalgia contributed to the association between mountaintop mining and depression they reported, though they did not measure this construct.

As wildfires can create dramatically different landscapes, solastalgia seems an important variable to examine that may influence the psychological health effects associated with a wildfire. After a wildfire, residents return to environments and landscapes that have often been changed vividly from those where they previously sought solace, recreated or earned a livelihood. Studies have found that after a wildfire residents' responses after a wildfire include grief from the loss of the forest and a strong desire to be able to reconnect with their landscape (Burns, Taylor, & Hogan, 2008; Ryan & Hamin, 2008). Understanding solastalgia as a source of psychological distress may open avenues of research that inquire into how land management might support improved community resilience and psychological health outcomes after a wildfire.

The current research also was informed by Flaskerud and Winslow's conceptual model for vulnerable populations research (Flaskerud & Winslow, 1998). This framework postulates that health status, operationalized as morbidity or mortality, is a product of interrelationships between resource availability and relative risk. Resource availability is shaped by socioeconomic and external factors such as income, social status, and family support. The surrounding ecosystem can also be seen as a resource, especially when

it provides recreational opportunities, solace, and a sense of well-being. Relative risks are factors that shape the degree of exposure one might have to a general risk such as the stressful events surrounding a wildfire. Many communities in fire prone areas are characterized by socio-economically advantaged populations who reside seasonally or have second homes in the area living side-by-side with permanent residents, or “locals”, who are often less advantaged as a group and derive their income from the tourism and recreation that nearby natural areas may provide (Winkler, Field, Luloff, Arannich, & Williams, 2007). In these areas, permanent residents may be at greater relative risk of harm from wildfires because they are more likely to be dependent on the local economy that may be adversely impacted, and may have less access to high quality health care, especially mental health, compared to seasonal residents.

This study joined the ecosystems and vulnerable populations perspectives to determine the resource and risk predictors, including losing the solace from the landscape resource, of psychological distress after a major wildfire in Arizona called the Wallow Fire.

METHODS

From May 29th – June 20th, 2011, the Wallow Fire burned 733 square miles in Apache County, Arizona. Six thousand people evacuated and 32 homes were destroyed. We

travelled to the affected area three months after the fire to conduct site visits and key informants interviews which provided formative data to build the survey. We sampled five communities that were affected by the fire. Nutrioso and Alpine were essentially surrounded by the fire and the fire burned to the outskirts of Greer and Eager. Springerville was not directly affected by the fire itself but was evacuated and experienced significant smoke issues.

We obtained a list of all land parcels within the five affected communities from the Apache County Assessor's Office. The file contained 11,634 records of individual land parcels in these towns. We removed records of duplicate land owners (e.g., people who own multiple land parcels), non-residential land use (i.e., vacant land parcels, commercial parcels, and government-owned parcels), and land with no residential improvements. The 32 homes that had been destroyed were not removed since the mail could be forwarded to a new address. The final size of the sample frame was 1,387 eligible target households. This methodology obviates the requirement for conducting a sample size estimate prior to fielding the survey.

From July 9, 2012 to August 31, 2012, we conducted a census survey that included all of these 1,387 records in the sample frame. Each address was mailed a survey in English inviting any adult who lived in the household to complete the survey. Non-responders were sent a second survey three weeks after the first mailing. Two hundred and seventy eight surveys were returned because they were undeliverable addresses.

The effective sample size was calculated to remove those 278 records resulting in 1,109 in the sample frame. Of these, 416 completed surveys were returned for a response rate of 37.5%. The study was reviewed and approved by the Office of the Human Research Protection Program at _____. Informed consent was obtained from all individual participants included in this study.

Measures

The Kessler Psychological Distress Scale (K10) was used to assess psychological distress. The K10 (and it's six item abbreviated version, the K6), is a well validated instrument used to screen for psychological distress in large, epidemiological surveys (R. C. Kessler et al., 2003). It has been administered in annual government health surveys in the United States, Canada, and Australia (Drapeau et al., 2010; Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002) and is also used by the World Health Organization in their World Mental Health Surveys (Kessler et al., 2010). The scale consists of 10 questions regarding level of psychological distress experienced in the past four weeks. Responses are provided on a five-point scale with response categories ranging from 1 = "none of the time" to 5 = "All of the time." The 10 items are summed to give scores ranging from 10 to 50 where higher score indicates greater likelihood of a depressive or anxiety disorder. In previous population studies, scores <15 were considered to reflect little or no risk for depression or anxiety (Anderson et al.,

2013; Ronald C. Kessler et al., 2003). Scores ≥15 reflect moderate or higher risk for depression or anxiety, or what would be deemed clinically significant psychological distress (e.g., 17.8% of persons with scores of 15-19 have either an anxiety disorder or a mood disorder such as depression; 35.7% of persons with scores of 20-24 have any of these disorders)(Andrews & Slade, 2001). The internal reliability was high, Cronbach's alpha = 0.93.

Solastalgia was measured using a scale adapted from Higgenbotham and supplemented with questions based on themes we heard during our formative research. The modified scale consisted of six items, with response options provided on a 4-point scale ranging from "strongly agree" to "strongly disagree." (see Table 1 for the questions). Individual item scores were summed to create an overall scale score that could range from 6 to 24, with higher scores indicating greater loss of solace due to the wildfire's effects on the forest.

The additional covariates we examined were demographic, resource, and relative risk variables. Demographic covariates were age and gender. Resources were household annual income and score on a scale that measures family functioning during times of situational stress. Higher values on the family function scale indicate better family functioning (Abramson, Park, Stehling-Ariza, & Redlener, 2010). Measures for relative risks were permanent residence versus seasonal residence, whether the respondent actively defended their home during the fire, and the overall financial impact of the fire

on their household. Permanent residents were persons who owned or rented a home in Apache County and lived in it year round. Seasonal residents were persons who owned or rented a home in Apache County and lived in it part-time or reported having unimproved property. Actively defending one's home was determined by the question, "During the Wallow Fire, did you do anything to actively defend your home from fire or smoke damage, such as activate an external sprinkler system, extinguish burning embers on or near your home, or hose down your roof?" Financial impact was asked with the question, "Overall, how would you rate the effect of the Wallow Fire on your household's current financial situation?" Response categories were "a very negative effect", "a somewhat negative effect", "no effect", "a somewhat positive effect", and "a very positive effect". Because of the low proportion that endorsed a somewhat positive or very positive effect, these two responses were combined.

Analysis

Psychometric performance of the solastalgia scale was investigated using standard procedures including item-frequency distributions, item-total correlations, internal consistency reliability analysis (Cronbach's alpha), and test-retest reliability (intra-class correlation coefficient). The scores were normally distributed and the mean score was 19.0 (SD 3.6). There was little clustering at the upper or lower ends of the scale by item, indicating the absence of ceiling or floor effects. Internal reliability using

Cronbach's alpha was 0.85. Corrected item-total correlations for the scale ranged 0.46 - 0.71. Principle components factor analysis found that all items loaded on one factor with an Eigenvalue of 6.52 explaining 58% of the variance in which each of the items loaded at values ranging from 0.59 to 0.82. As shown in Table 1, each of the solastalgia items was endorsed by more than half of the participants. For example, over 71% agreed or strongly agreed with the statement, "I feel like I have been grieving for the loss of the forest affected by the Wallow Fire." The most highly endorsed were "seeing the forest affected by the Wallow Fire has been stressful" and "I feel sad when I look at the landscapes damaged by the Wallow Fire."

Hypothesis testing was performed in two phases. Bivariate analyses determined the relationship of each of the covariates with psychological distress (K10 score $\geq$15). We then performed multivariate logistic regression analyses predicting psychological distress with each of covariates that were independently associated in the bivariate analyses with the K10 (at a *p* value of $\leq$0.05). Multivariate logistic regression-generated adjusted odds ratios (aOR) and 95% confidence intervals (95% CI) were used to indicate the strength of the relationship between predictors and psychological distress, after adjusting for confounding by the other covariates. Analysis was conducted using SAS version 9.1.3.

RESULTS

The demographic characteristics of the respondents reflected the fact that many residents in the impacted communities are second home owners (48.8%). A large proportion were retired (44.3%), 38.8% worked full-time and 8.8% worked part-time. Education levels were mixed: 45% had college degrees, 37.8% had some college or a two year degree, 14.9% had completed high school and only 2.4% had less than a high school education. Additional sample characteristics are provided in Table 2.

The mean K10 score for the overall sample was 15.3 (range 10-48; sd 6.4) (Figure 1). Sixty-five percent of participants had K10 scores indicative of low or no risk for depression or anxiety, i.e., K10 of 10-14; 35% of the sample had K10 scores reflective of moderate or higher risk for depression or anxiety, K10 $\geq$ 15. Mean K10 scores were highest among women (16.6), permanent residents (16.6), persons who actively defended their home (17.5), persons in the lowest income tier (18.0), and persons who experienced very negative financial consequences from the fire (18.6) (Table 3).

In the bivariate analyses, factors associated with a K10 score $\geq$ 15 were active defense of one's home from fire (OR 2.15, 95%CI 1.35-3.42), permanent residence (OR 1.53, 95%CI 1.00-2.35), experiencing a somewhat negative financial effect from the fire (OR 3.78 95% 2.34-6.09), experiencing a very negative financial effect (OR 3.11, 95% 1.55-6.24), and solastalgia (OR 1.29, 95%CI 1.19-1.38) (Table 3). Annual income exceeding >$80,000 was associated with lower likelihood of clinically significant psychological distress (OR 0.47, 95% CI 0.28-0.80).

In the multivariate analysis, defending one's home and permanent residence were no longer significantly associated with psychological distress. Solastalgia continued to be associated with psychological distress; a one point increase on the solastalgia scale increased odds of psychological distress by 1.26 times (aOR 1.26, 95% CI 1.16-1.37). Similarly, experiencing a very negative financial effect (aOR 2.62, 95% CI 1.06-6.51) and a somewhat negative financial effect (aOR 2.23, 95% CI 1.25-3.97) were associated with a K10 score $\geq$15 controlling for solastalgia and other factors. Family functioning (aOR 0.81, 95% CI 0.84-0.93) and annual income >$80,000 (aOR 0.47, 95% CI 0.24-0.93) were associated with lower risk of clinically significant psychological distress.

We conducted additional focusing on differences in financial effects among permanent and seasonal residents. 43.9% of permanent residents reported a somewhat or very negative financial effect compared to 31.2% of seasonal residents (p=0.035) (data not shown). Permanent residents reported the following sources of lost income: 33% lost income while evacuated, 28.6% lost income during the fire due to business slowing or closures and 28.2% lost income after the fire due to business slowing or closures. Among seasonal residents, 6.5% lost income while evacuated, 3.5% lost income during the fire due to business slowing or closure and 4.2% lost income after the fire due to business slowing or closure (p<0.001 for all comparisons). Additionally, 33% of

permanent residents reported home damage compared to 17.4% of seasonal residents (p=0.003).

DISCUSSION

This study extends knowledge on the psychological health impacts of wildfires and what factors may contribute to psychological distress after a fire. Three relative risks--full-time residency, actively defending one's home from the fire, and negative financial impacts--were associated with psychological distress, however, only negative financial impact remained significant in the multivariate analysis. The three resource variables – annual income, family function and solastalgia – were associated with psychological distress in bivariate and multivariate analysis. The multivariate analysis suggests that what is critical to long-term psychological health outcomes is financial and familial resources to absorb any losses, and loss of the landscape.

Prior research has also tied income loss, low socioeconomic status, and disruptions in family function to psychological distress after disaster events (Bonanno, Brewin, Kaniasty, & La Greca, 2010; Norris et al., 2002). That actively defending one's home was associated with distress may indicate that more direct experience with fire contributes to greater psychological health impact. However, these findings should be qualified since we did not specifically ask how direct the threat was to the individual. It

is possible that individuals took action to protect their house, such as turning on a sprinkler system, even when flames were not in the immediate area. Nor can we say anything about causation; it is not possible to know whether those who were already distressed for some reason were more likely to do something to protect their homes, or whether it was the actual act of protecting that led to distress. Finally, this relationship disappeared when accounting for other factors such financial impact from the fire and family functioning.

We were not surprised to find that permanent residents experienced more negative financial impact from the fire than did seasonal residents. Our study could not disentangle the source of the negative financial impact reported by seasonal residents. Our survey did not capture the nuances and myriad ways in which permanent and seasonal residents could have suffered financial losses. For instance, seasonal residents who used their homes as rental properties may have felt financial losses that we did not inquire about, thereby minimizing some of the differences between the two groups.

While the multivariate analysis indicates, unsurprisingly, that negative financial impacts had the strongest effect, the significant effect of solastalgia is perhaps the most notable of our findings given the limited existing work demonstrating the potential import of the construct. Persons who scored higher on the solastalgia score were significantly more likely to report psychological distress and this association remained in the multivariate

regression controlling for adverse financial impact ($p<0.001$). This provides support for the ecosystem health perspective that dramatic transformation of a landscape by an environmental event such as a wildfire can affect its value as a source of solace. Psychologists and social scientists have begun to recognize that landscape changes brought by climate change and accompanying disasters may be an important future source of distress (Doherty & Clayton, 2011; Higginbotham, Connor, Albrecht, Freeman, & Agho, 2006; Palinkas, 2012).

Community members, too, recognize this distress. During our trips to the study site residents told us they were "grieving for the loss of the landscape." Ryan and Hamin report similar community awareness after the 2000 Cerro Grand Fire in Los Alamos, New Mexico: "There's so many people here who just grieve at the condition of the forest." (Ryan & Hamin, 2008)[p.376]. Interestingly, solastalgia was experienced equally by both permanent and seasonal residents in our study. Respondents reported the same level of solastalgia regardless of whether they were permanent or seasonal residents in the affected towns (data not shown).

Future studies of other disasters should examine the concept of solastalgia to see if it provides a potential construct that can be incorporated into models for understanding the impacts of disasters on individuals, families and communities. Our six item solastalgia scale was slightly shorter than the nine item scale used by Higgenbotham et al. and demonstrated good psychometric properties and correlation with psychological

distress, providing preliminary construct validation for a brief measure. Our measure can be used to assess this relationship in wildfires and may be useful for measuring the environmental distress resulting from other climate-induced alterations in the physical landscape.

For wildfire, recognizing the possibility of solastalgia-related distress may be useful in developing community recovery programs. That the physical changes seen in a post-wildfire community may contribute to psychological distress—even for those who did not experience other direct traumas of the fire—hints at novel interventions that wed community psychology and forest management. The questions in the solastalgia scale indicate a loss of connection to the surrounding forest suggesting that recovery efforts may want to focus on rebuilding that connection. Indeed, the few studies that have examined community post-fire recovery have described programs in which local volunteers became involved in forest recovery programs that connect them back to the surrounding forest (Burns et al., 2008; Ryan & Hamin, 2008). Similarly, after the 9/11 terrorist attacks and again after Hurricane Sandy in October 2012, planting trees, creating green memorials, and cleaning up and starting urban gardens may have contributed to the recovery of the communities (Svendsen, Baine, Northridge, Campbell, & Metcalf, 2014). Additional health outcomes research could help understand how collaborative restoration efforts between land managers, community psychologists and local volunteers might promote community psychological recovery by helping individuals regain their connection to the land. Combined with the findings that negative financial

impacts raise the risk of psychological distress and a supportive family lowers that risk, this study suggests that further research should explore how addressing solastalgia, income loss, and supportive families can be useful components of community recovery programs following fires.

There are several limitations to this study. Although we attempted to conduct a full census of the inhabitants surrounding the fire we were only able to achieve a 38% response rate. As we were not able to test for non-response bias, caution should be used in applying results to the entire community. We might have missed eligible adults within a household by not taking multifamily houses into account when we mailed the survey. Nor did we allow multiple adults in a single household to respond to the survey. Also, our sample may be biased because we did not select a random adult from each household and the adult most interested in the survey may have filled it out. To the extent that people in greatest distress might be more likely to have taken part in the survey, our study might overestimate the level of psychological distress in the community; though previous wildfire surveys have speculated that non-respondents were more distressed than respondents (e.g. McFarlane 1997). We may also have missed non-English speaking residents since our survey was only available in English. The cross-sectional nature of this study hampers the ability to draw firm inferences regarding the causal relationship between fire exposure and psychological distress. Still, as climate change may bring more dramatic changes to the physical landscape, it

is critically important to broaden the current understanding of the ways in which climate-induced alterations in the physical landscape affects health and well-being.

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Table 1. Responses to Solastalgia Scale, N=410 ("Below are some statements that people might make about the forest affected by the Wallow Fire. Please rate to what extent you agree or disagree with each statement. Please check only one box per row.")

Solastalgia Questions	**% Strongly agree**	**% Agree**	**% Disagree**	**% Strongly disagree**

Seeing the forest affected by the Wallow Fire has been stressful.	55%	38%	6%	1%
I have gone to the area affected by the Wallow Fire less than I did before the fire.	29%	40%	24%	7%
I feel like I have been grieving for the loss of the forest affected by the Wallow Fire.	30%	41%	24%	4%
I feel sad when I look at the landscapes damaged by the Wallow Fire.	57%	38%	4%	1%
I feel that aspects of living near the forest that I value were lost after the Wallow Fire.	30%	34%	29%	7%
Unique aspects of nature in this place were lost after the Wallow Fire.	44%	41%	13%	2%

Table 2. Characteristics of Study Participants (N=416)	
Variable	**Frequency**
Gender (n=408)	
Male	211 (51.7%)
Female	197 (48.3%)
Age (means, sd) (n=402)	62.4 (sd 12.4)
Annual Income (n=367)	
Less than $40,000	96 (26.3%)
$40,00—$79,999	123 (33.3%)
$80,000 or more	148 (40.3%)
Residence Type (n=409)	
Permanent resident	207 (51.2%)
Seasonal resident	202 (48.8%)
Actively defended home (n=389)	103 (26.5%)
Financial effect (n=411)	
No effect	243 (59.1%)
Positive	15 (3.65%)
Somewhat negative	115 (28.0%)
Very negative	38 (9.3%)
Solastalgia (mean, sd) (n=410)	19 (sd 3.6)
Family Function (mean, sd) (n=380)	38 (5.6)

Table 3. Mean Kessler 10 score and results of bivariate and multivariate regression analyses.					
Variable	**Mean K10 score**	**Unadjusted Odds Ratio (CI)**	**p-value**	**Adjusted Odds Ratio (CI)**	**p-value**
Gender					
Male	14.9	---	---	---	---
Female	16.0	1.29 (0.85-1.94)	0.23	---	---
Age	-	0.99 (0.98-1.01)	0.78	---	---
Annual Income					
Less than $40,000	18.0	---	---	---	---
$40,00—$79,999	15.1	0.62 (0.36-1.07)	0.085	0.61 (0.31-1.17)	0.14
$80,000 or more	13.9	0.47 (0.28-0.80)	0.005	0.47 (0.24-0.93)	0.03
Residence Type					
Permanent	16.6	1.53 (1.00-2.35)	0.05	1.17 (0.66-2.08)	0.60
Seasonal	13.9	---	---	---	---
Actively defended home	17.5	2.15 (1.35-3.42)	0.001	1.50 (0.83-2.72)	0.18
Financial effect					
No effect	13.5	---	---	---	---
Positive	17.8	3.63 (0.76 – 19.74)	0.10	1.25 (0.28-4.52)	0.87
Somewhat negative	17.8	3.78 (2.34-6.09)	<0.001	2.23 (1.25-3.97)	0.01
Very negative	18.6	3.11 (1.55-6.24)	0.014	2.62 (1.06-6.51)	0.04
Solastalgia	---	1.29 (1.19-1.38)	<0.001	1.26 (1.16-1.37)	<.001
Family Function	---	1.15 (1.07-1.16)	<0.001	0.81(0.84-0.93)	<.001

LIST OF FIGURES AND TABLES