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# Psychosocial resources underlying disaster survivors' posttraumatic stress symptom trajectories: insight from in-depth interviews with mothers who survived Hurricane Katrina

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## ABSTRACT

**Background:** Weather-related disasters, including hurricanes, are becoming more frequent and severe due to climate change. Vulnerable populations, such as people with low income and racial and ethnic minorities, are particularly prone to increased levels of physical harm and psychiatric adversity from weather-related events.

**Objectives:** We aimed to explore psychosocial resources and coping of survivors with three different posttraumatic stress symptom (PTSS) trajectories (*High-Decreasing*, *Moderate-Decreasing*, and *High-Stable*), after Hurricane Katrina across two different time points: F1 (1-year post-disaster) and F3 (12 years post-disaster).

**Method:** Participants in this multi-method study were part of a larger cohort of the Resilience in Survivors of Katrina (RISK) project. Transcripts of interviews completed at the two time points were analysed using two qualitative methods, combining thematic analysis and narrative analysis, and providing both breadth of perspectives with the depth of specific case studies.

**Results:** Sixteen survivors completed interviews at both F1 and F3. From our in-depth analysis of the data, we derived five inductive themes: 'Hope,' 'Adaptive vs maladaptive avoidance,' 'Emotional delay,' 'Acceptance, Finding Meaning and Being in the Moment,' and 'Coping strategies.' Survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories experienced hope for future, accepted the hurricane and its results, and found efficient ways to cope with their situation. Survivors with *High-Stable* PTSS trajectories tended to express a lack of hope for future and struggled to be mindful and accept the hurricane and its harm. Unlike survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories, survivors with *High-Stable* PTSS trajectories also reported less social and family support and faced more discrimination and racism.

**Conclusion:** There are factors beyond individual-level psychosocial resources that may shape post-disaster resilience. When supporting survivors after a weather-related disaster, it is essential to provide ongoing psychological, financial, and physical assistance to bolster these resources.

## Recursos psicosociales que subyacen en las trayectorias de síntomas de estrés postraumático de los sobrevivientes de desastres: perspectiva de entrevistas en profundidad con madres que sobrevivieron al Huracán Katrina

**Antecedentes:** Los desastres asociados al clima, incluyendo los huracanes, se tornan cada vez más frecuentes y severos debido al cambio climático. Las poblaciones vulnerables, tales como las personas de bajos ingresos y aquellas pertenecientes a minorías raciales y étnicas son particularmente susceptibles de presentar un incremento en el riesgo de daño físico y de adversidad psiquiátrica relacionados con eventos asociados al clima.

**Objetivos:** El objetivo fue el explorar los recursos psicosociales y de afrontamiento de los sobrevivientes con tres trayectorias distintas de síntomas de estrés postraumático (SEPT) luego del huracán Katrina (*alta en declive*, *moderada en declive* y *alta estable*) en dos momentos: F1 (un año luego del desastre) y F3 (12 años luego del desastre).

**Métodos:** Los participantes de este estudio multimetodológico formaban parte de una cohorte más grande, perteneciente al proyecto de Resiliencia en Sobrevivientes a Katrina (RISK por sus siglas en inglés). Se realizaron las transcripciones de las entrevistas en los dos momentos y fueron analizados empleando dos métodos cuantitativos, combinando análisis temáticos y narrativos, y brindando tanto profundidad en las perspectivas como profundidad en casos específicos de estudio.

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## KEYWORDS

Weather-related disasters; survivors' mental health; qualitative study; PTSS trajectories; mixed methods

## PALABRAS CLAVE

Desastres asociados al clima; salud mental de sobrevivientes; estudio cualitativo; trayectorias de los SEPT; métodos mixtos

## 关键词

天气相关灾害; 幸存者心理健康; 定性研究; PTSS 轨迹; 混合方法

## HIGHLIGHTS

- After Hurricane Katrina, survivors with different posttraumatic stress symptom trajectories reported different levels of hope, mindfulness, and willingness to talk about the hurricane, emotional processing, and coping strategies.
- These experiences varied over time for survivors in all three trajectories.
- Survivors who report ongoing high levels of symptoms should be offered additional support to bolster these psychosocial resources.

**Resultados:** Dieciséis sobrevivientes fueron entrevistados tanto en F1 como en F3. De nuestro análisis a profundidad de los datos, obtuvimos cinco temas inductivos: 'Esperanza', 'evitación adaptativa versus desadaptativa', 'retraso emocional', 'aceptación, encuentro de propósito y estar en el momento' y 'estrategias de afrontamiento'. Los sobrevivientes con las trayectorias de SEPT *alta en declive y moderada en declive* experimentaron esperanza en el futuro, aceptaron el evento del huracán y sus consecuencias, y encontraron formas eficientes de afrontar su situación. Los sobrevivientes con la trayectoria *alta estable* presentaron una tendencia a expresar falta de esperanzas en el futuro y presentaban dificultades para estar presentes en el momento y aceptar al evento del huracán y el daño ocasionado. A diferencia de los sobrevivientes de las trayectorias *alta en declive y moderada en declive*, los sobrevivientes con la trayectoria *alta estable* también reportaban menor soporte social y familiar y enfrentaban mayor discriminación y racismo.

**Conclusión:** Existen factores más allá de los recursos psicosociales a nivel individual que podrían influir en la resiliencia luego de un desastre. Es fundamental el brindar asistencia psicológica, financiera y física mientras se brinda soporte luego de un desastre asociado al clima para reforzar estos recursos.

### 灾难幸存者创伤后应激症状轨迹背后的心理社会资源：对卡特里娜飓风幸存母亲的深入访谈的洞见

**背景:** 由于气候变化，包括飓风在内的天气相关灾害变得越来越频繁和严重。易感人群，例如低收入人群和少数民族和族裔，特别容易因天气相关事件而遭受更大程度的身体伤害和精神不良。

**目的:** 我们旨在探索卡特里娜飓风过后两个不同时间点具有三种不同创伤后应激症状 (PTSS) 轨迹 (高度下降、中度下降和稳定高) 的幸存者的社会心理资源和应对方式: F1 (1- 灾后一年) 和 F3 (灾后 12 年)。

**方法:** 这项多方法研究的参与者是卡特里娜飓风幸存者心理韧性 (RISK) 项目中更大队列的一部分。在两个时间点完成的访谈记录使用两种定性方法进行分析，结合主题分析和叙述分析，提供广泛的视角以及具体的案例研究。

**结果:** 16 名幸存者在 F1 和 F3 完成了采访。通过对数据的深入分析，我们得出了五个归纳主题: '希望'、'适应性与适应不良回避'、'情绪延迟'、'接受、寻找意义和活在当下'和'应对策略'。PTSS 轨迹高度下降和中度下降的幸存者对未来充满希望，接受飓风及其后果，并找到有效的方法来应对他们的处境。具有稳定高 PTSS 轨迹的幸存者往往表示对未来缺乏希望，并努力保持警惕并接受飓风及其危害。与具有高度下降和中度下降 PTSS 轨迹的幸存者不同，具有高度稳定 PTSS 轨迹的幸存者也报告了较少的社会和家庭支持，并面临更多的歧视和种族主义。

**结论:** 除了个人层面的社会心理资源之外，还有其他因素可能会影响灾后心理韧性。在天气相关灾难发生后支持幸存者时，必须提供持续的心理、经济和身体援助以支持这些资源。

## 1. Introduction

In the last two decades, weather-related disasters, including hurricanes, have become more frequent and severe due to climate change in many parts of the world (Chen et al., 2020; Intergovernmental Panel on Climate Change, 2022; Montanya & Valera, 2016). According to National Oceanic and Atmospheric Administration, United States (US) Department of Commerce (NOAA) Office for Coastal Management (2022), in 2021, the five-year average cost of weather-related disasters was approximately \$148.4 billion per year in the US, and between 2000 and 2020, there were a total of 2013 deaths related to hurricanes in the US (World Meteorological Organization, 2021). A robust body of research has shown that weather-related disasters are associated with a range of adverse mental health outcomes, including generalised psychological distress, anxiety, depression, and PTSD (Agyapong et al., 2020; Goldmann & Galea, 2014; Labarda et al., 2020; Mclaughlin et al., 2009). Vulnerable populations, including people with low income and racial and ethnic minorities, are particularly

prone to increased levels of physical harm and psychiatric adversity following weather-related events (Benevolenza & DeRigne, 2019; Berberian et al., 2022).

Longitudinal research has shown that, for some survivors, the psychological toll of weather-related disasters persists over the long-term. Specifically, trajectory analyses have found that, whereas the majority of survivors tend to have consistently low post-trauma mental health symptoms, often termed resilience, substantial proportions have a short or long-term increase in symptoms (Norris et al., 2008; Self-Brown et al., 2013). Post-disaster trajectories may embody recovery, meaning short-term elevations in symptomatology and disturbances in functioning that resolve over time (Mayou et al., 2002); consistently sub-syndromal symptomatology, or moderate symptoms below the diagnostic criteria that persist over time (Cukor et al., 2010); and/or chronically elevated symptoms sustained over time (Bonanno, 2004; Galatzer-Levy et al., 2018).

Understanding factors that relate to the likelihood of post-disaster PTSD symptom trajectories could have important implications for efforts to promote

resilience in the aftermath of these increasingly common events. To date, a substantial body of research has provided evidence of several robust predictors of symptomatic post-disaster trajectories, including demographic characteristics (e.g. female gender), disaster-related exposures (e.g. bereavement, disrupted access to life-sustaining resources), and low social support (e.g. Lai et al., 2021; Lowe et al., 2020). Although these findings could be useful for identifying survivors in need, they provide limited insight into how pre- and post-disaster clinical and public health interventions might go about promoting resilience by nurturing psychosocial resources (Hobfoll, 2002).

However, research to date suggests that psychosocial resources might be critical in fostering disaster survivors' wellbeing. In a comprehensive review of the broader PTSD trajectory literature, with only seven of 54 identified studies conducted in the aftermath of weather-related disasters, Galatzer-Levy et al. (2018) found that, in addition to demographic characteristics and environmental factors, several individual factors related to emotional functioning were associated with a resilient trajectory, including coping strategies and styles, as well as the extent to which they can be applied flexibly. Outside of the PTSD trajectory literature, some studies in the aftermath of weather-related disasters have identified psychosocial resources that may protect against adverse mental health consequences. These include hope and gratitude (Appel et al., 2021), goal orientation and agency (Long et al., 2020), a sense of purpose and optimism (Lowe et al., 2013), and some coping strategies, such as problem solving, social support, and submission (Raccanello et al., 2022). In contrast, avoidant coping strategies (e.g. drug and alcohol use to reduce stress) have been associated with higher psychological distress after a disaster (Usher et al., 2022). Yet, the role of psychosocial resources in shaping post-disaster mental health, especially in the long-term aftermath of disasters, remains understudied.

An additional limitation of the existing literature on post-disaster psychological trajectories is that few studies have integrated qualitative data. In one exception, Lowe et al. (2015) drew on qualitative data from approximately five years after Hurricane Katrina to provide insight into the complex processes underlying pre- to post-disaster trajectories of psychological distress among a sample of low-income mothers from New Orleans. The authors identified other factors evident in participants' accounts that contributed to trajectory membership beyond those identified in quantitative analysis, including proximal pre-disaster experiences (e.g. intimate partner strain), pre-disaster psychosocial resources (e.g. social support, improved coping skills), hurricane-related exposures and stressors (e.g. sustaining damage to property, stressful living conditions), post-disaster impacts and outcomes

(e.g. psychological distress), and pre- to post-disaster changes in psychosocial resources (e.g. emotion regulation skills). However, this study focused on a broad range of factors, not on psychosocial resources specifically, and included qualitative data from only one post-disaster time point spanning 4–7 years post-disaster.

In the current study, we aimed to explore the psychosocial resources of survivors with different PTSD symptom trajectories after Hurricane Katrina at two different time points, 1 year after the hurricane (F1) and 12 years after the hurricane (F3). To date, there is no published study in the aftermath of disasters that has drawn on multiple waves of in-depth qualitative data to explore survivors' experiences over time. We address this gap in order to better understand changes in survivors' experiences and mental health needs.

## 2. Methods

### 2.1. Sample and data collection

This study drew on data from the Resilience in Survivors of Katrina (RISK) project (Waters, 2016). RISK participants were initially part of the Opening Doors Study, a randomised control trial that aimed to increase the community college retention of low-income parents at sites across the United States, including two community colleges in New Orleans, Louisiana. After Hurricane Katrina made landfall in the New Orleans area on 29 August 2005, leading to nearly 2000 deaths and an estimated \$81 billion USD in damages, the two New Orleans community college sites were closed for the Fall 2005 semester. With their consent, participants from these sites were enrolled in RISK, a new study of survivors' experiences during the hurricane and its aftermath and the impact of the hurricane on their life trajectories. A total of 1019 participants completed a baseline pre-disaster survey as part of Opening Doors in 2003–2003. Of these, 942 were women and have been the focus of the RISK project. All RISK participants are mothers, and the majority (85.9%) identify as non-Hispanic Black. Since Hurricane Katrina, three follow-up survey assessments have been conducted at approximately 1-, 4-, and 12-years post-disaster (F1, F2, and F3, respectively). Retention rates have been high across the study waves: 667 (70.8%) completed the F1 survey, 714 (75.8%) the F2 survey, and 715 (75.9%) the F3 survey; 885 (93.7%) completed at least one post-disaster survey. Chi-square and independent-samples t-tests compared the participants in this analysis to the rest of the RISK project sample. Participants in the sample were significantly younger than other RISK participants ( $t[16.30] = 3.16$ ,  $p = .006$ , equal variances not assumed). The racial distribution of included participants was also significantly

different from other RISK participants,  $\chi^2(3) = 8.48$ , with Hispanic participants overrepresented. There were no differences between the analytic subsample and other participants on marital status or posttraumatic stress at any wave of data collection.

Each survey round was accompanied by a series of in-depth interviews with a subsample of participants living in either the New Orleans, Louisiana, or Houston, Texas areas, where the majority of the participants resided. At each wave, participants were purposively sampled to capture a range of post-disaster experiences and psychosocial outcomes, as indicated by survey responses. There were three rounds of interviews, each corresponding to the survey waves: F1 occurred from late 2006 to early 2007, coinciding with the first round of post-hurricane follow-up quantitative surveys, and involved a subset of 57 respondents who had completed that round of surveys who lived in Orleans or Jefferson Parish prior to the storm and who had experienced damage to their pre-hurricane home. Respondents were also selected to contain a comparable number of respondents who had returned to New Orleans after the storm and respondents who had relocated elsewhere (Lowe, Lustig, et al., 2011). F2 coincided with the second post-hurricane wave of the surveys, included an additional 49 participants, and was carried out between April 2009 to October 2009. Fourteen additional interviews were conducted between August 2011 and April 2012 in order to capture the six different mental health trajectories as measured by the latent class analysis of psychological distress in the previous waves of survey data collected (Lowe et al., 2015). F3 included 43 interviews that took place July 2018 to August 2019, roughly coinciding with the third wave of surveys. All interview participants from F3 had already participated in at least one round of in-depth interviews.

The interview protocol was designed by an interdisciplinary team of psychologists, sociologists, and public health scholars. Questions were designed using a life course framework; exploring the disaster as a 'turning point' in the life course trajectories of these young adults (Sampson & Laub, 2016, p. 326). The protocol covered a series of topics informed by previous research on post-disaster adversity and resilience, including pre-disaster employment and education, and post-disaster decisions about employment, education, and housing. The protocol began with questions about hurricane experiences, and then covered several life domains, including family relationships, social networks, education, housing and neighbourhoods, employment, mental and physical health and sources of strength and resilience, including questions about posttraumatic stress and posttraumatic growth. The interviews were used both to understand patterns in the survey data at a previous wave, and to generate questions for the

surveys in later waves. In this way, the quantitative and qualitative data were integrated and informed the questions and themes explored over the course of the longitudinal study. Interviews followed a semi-structured protocol. Interviews were meant to cover the same topics and questions, although not necessarily in the same order or with the same use of interview probes (Garner & Scott, 2013; Weiss, 1994). As the interviews took place over an extended period, a large team of interviewers conducted these interviews. Interviewers included three clinical psychology doctoral students (two White women, one Asian American man), two sociology professors from New Orleans (one Black woman, one White woman), one graduate student in urban planning (a Black man) and three sociology doctoral students (two White women and one White man). Interviewers all received the same interview guide, but were also trained to let the interview unfold as a conversation, without sticking rigidly to a protocol. Interviewers received training from the principal investigators of the project. This training included a review of the interview questions, rehearsal of the process via role-play exercises, and a refinement of the question phrasing and order. Interviews were conducted at a mutually convenient location, typically the participant's home, and lasted approximately 90 min. Interviews covered a range of topics, including participants' perspectives on their current life circumstances, including their social relationships, mental and physical health, housing and neighbourhoods, education, employment, and children's well-being, and how each had been affected by Hurricane Katrina and its aftermath. Additionally, at F1, interviewees recounted their experience with the hurricane and its aftermath, including their experiences in evacuation, securing post-disaster housing, and interfacing with Federal Emergency Management Agency (FEMA) and non-profit organisations. Participants provided written consent at baseline and at all subsequent interviews. Interviewees received a \$50 gift card for their participation. The Institutional Review Board at Harvard University approved all study procedures. Additional details about the RISK study procedures have been published elsewhere (Waters, 2016; Raker et al., 2019).

As mentioned previously, recruitment efforts for F3 focused on participants who had previously been interviewed. For the current analysis, we focus on participants who were interviewed at both F1 and F3 in order to provide a sense of how participants' perspectives on the hurricane and their current circumstances, the factors that bolstered or hindered their resilience changed from the short- to long-term aftermath of the disaster, and variation across the three PTSD trajectories. All 16 participants who completed interviews at F1 and F3 had been included in the PTSD trajectory

analysis (Lowe et al., 2020), and comprised the analytic sample.

## 2.2. Data analysis

### 2.2.1. Classification of participant sub-groups

The 16 participants were divided into three groups based on the results of a prior analysis of the RISK project survey data (Lowe et al., 2020). In brief, the analysis included the 885 women who had completed at least one post-disaster survey, in which they reported on posttraumatic stress symptoms (PTSS) via the 22-item Impact of Event Scale-Revised (IES-R; Weiss & Marmar, 1997), a measure with good psychometric properties (Creamer et al., 2003). Participants indicated how often over the past week they had been bothered by experiences related to the hurricane (e.g. 'pictures about it popped into my mind,' 'I was jumpy and easily startled') on a four-point scale: 'not at all' (0), 'a little bit,' (1), 'moderately' (2), 'quite a bit' (3), and 'extremely' (4). Scale scores were computed as the mean of all items. A latent class growth analysis found that a three-class model best represented the data, and was comprised of three distinctive trajectories, or patterns of PTSS over time: *Moderate-Decreasing* (69.3%,  $n = 614$ ), characterised by average scores between 'a little bit' (1) and 'moderately' (2) at F1, and between 'not at all' (0) and 'a little' at F2 and F3; *High Decreasing* (23.1%,  $n = 204$ ), characterised by average scores between 'moderately' (2) and 'quite a bit' (3) at T1, and between 'a little bit' (1) and 'moderately' (2) at T2 and T3; and *High-Stable* (7.6%,  $n = 67$ ), characterised by average scores between 'moderately' (2) and 'quite a bit' (3) at all three post-disaster time points. In a three-step multinomial regression analysis accounting for uncertainty in participants' classification (Asparouhov & Múthen, 2014) and adjusting for demographic characteristics and disaster exposure, we previously examined three pre-disaster factors – probable psychological distress, number of physical health problems or conditions, and perceived social support as predictors of trajectory membership. Only pre-disaster psychological distress remained a significant predictor in the fully adjusted model and was associated with increased odds of membership in the *High-Stable* trajectory, relative to the *Moderate-Decreasing* trajectory. Notably, no post-disaster factors, including post-disaster psychosocial resources, were included in the analysis.

### 2.2.2. Qualitative analysis

We combined a thematic analysis (Braun & Clarke, 2006) and illustrative case examples, that drew on the methods of narrative analysis (Smith, 2015). Braun and Clarke (2006) characterise thematic analysis as independent of theory and epistemology. This approach also provides researchers flexibility with

well-structured analysis steps (Braun & Clarke, 2019). We chose to use a thematic analysis in order to allow for a rich, detailed, and complex account of data. Narrative research would be defined as a methodology that examines individual lived experiences as a source of knowledge in itself that guarantees a deeper understanding (Mitchell & Egudo, 2003; Nasheeda et al., 2019). For this reason, we also used narrative analysis to demonstrate the detailed experiences of specific cases from each trajectories. With using thematic analysis, we could enable to provide wide overview of the dataset, and with the narrative analysis, we have provided an expanded focus on details of the experiences of the survivors, including specific situations. We followed the approach of Frerichs et al.'s (2020) study in which they used thematic analysis and narrative analysis, as an example of conducting and reporting a multi-method qualitative analysis.

**2.2.2.1. Thematic analysis.** Interview transcripts were analysed following the principles of reflexive thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2019). In the first step of the analysis, all the transcripts were read and re-read by ST and SL to increase familiarity with the data and ideas were discussed in meetings. In the second step, ST and SL analysed the transcripts separately and generated a list of potential initial codes. In meetings, independently generated codes were discussed and agreed upon. Later, those were combined into a preliminary coding framework. In the third step, transcripts were imported to NVivo Pro V12 and coded according to the preliminary coding frame. All codes were inductive and generated from the data, rather than being determined by existing hypotheses. In the fourth step, the data set was reviewed as a whole and preliminary codes collapsed and combined into broader themes by ST, SL, and MW. The final version of the themes was agreed and improved with feedback from all the authors.

**2.2.2.2. Narrative analysis.** Narrative analysis was used to explore how three individuals, one from each trajectory, experienced Hurricane Katrina and the years following the storm. Interviews were selected to explore how different experiences before, during, and after the storm, as well as different social and familial contexts, varied across the different trajectories. We used narrative analysis techniques to identify and detail one case from each trajectory. Narrative analysis has been argued to offer a rich, detailed description of the variation of survivors' experiences and needs over time (Wong & Breheny, 2018) and was intended in this study to further illustrate and elaborate on the findings from the thematic analysis.

The narrative analysis involved three stages: firstly, the transcripts of one survivor from each trajectory

were selected to represent the group and to provide maximum variation across groups. Cases were selected based on participants' evacuation experiences, their experiences in the place where they were evacuated, their social and familial relationships, other traumatic events experienced, and the psychosocial resources of survivors, such as coping skills. Cases were chosen by ST and KB, who were familiar with all interviews. Secondly, five members of the research group read the interviews separately. ST and KB met four times to discuss the narrative analysis. ST and KB independently identified possible case study participants. In the first meeting, ST and KB discussed which survivors were most suitable for the case study and selected one participant for each trajectory. Then, ST and KB read all the interviews of potential case studies and made detailed notes on their understanding of different experiences of survivors separately. In the second, third, and fourth meetings, they shared their own interpretations of the narratives. Finally, drafts of all three cases were circulated to the SL, MW, and JB for further comments and agreement, and the views of the members of the research team were integrated with ST and KB's process. Finally, after all comments and inputs were collected from the rest of the group, final drafts of the case studies were prepared. While writing each case study, KB and ST highlighted the participants' experiences after the hurricane as well as how these experiences changed over time.

### 2.3. Reflexivity

There is a variety among the researchers who conducted this study including different career stages (one PhD student, one post-doctoral researcher, and three professors) and cultural groups (Turkish, British, American). ST is a PhD student at the University College London (UCL), UK KB is an environmental epidemiologist and a postdoctoral fellow at Brown University in the United States. JB is a Consultant Clinical Psychologist and Associate Clinical Professor at UCL, UK, with over 20 years of experience working in the UK National Health Service (NHS), academia and UK Government. MW is a demographer,

sociologist, and a Professor of Sociology at Harvard University. SL is a clinical psychologist at Associate Professor in the Department of Social and Behavioural Sciences at Yale School of Public Health with expertise in disaster mental health.

## 3. Results

Of the 16 participants who completed both the F1 and F3 in-depth interviews, 10 had their most likely class membership in the *Moderate-Decreasing* trajectory; four in the *High-Decreasing* trajectory; and two in the *High-Stable* trajectory. The gender, age range, and education backgrounds of the participants are shown in Table 1.

### 3.1. Thematic analysis

From our in-depth analysis of the data, we derived five inductive themes (see Table 2).

#### 3.1.1. Hope

Most of the survivors mentioned that it was important for them to feel hope for the future. However, the perspectives and experiences of 'hope' differed across interviewees in the three trajectories. For example, survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories more often expressed hopefulness in the form of setting and committing to goals for the future, even if they subjectively felt sad and/or anxious in the aftermath of Hurricane Katrina. In this way, these survivors demonstrated an optimism about the future, and a belief that their lives, and the lives of their families, could improve. A commonly mentioned hope of many survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories was related to education. Many of the survivors stated that they aimed to return to their education, which they had to leave for various reasons (e.g. childbirth, financial strain, challenges in post-disaster recovery).

You have to make changes and sacrifices to do what you have to do to make life better for you and your kids. It's up to you for what you want to go after and what your goals are. (Survivor with *High-Decreasing* PTSS trajectory)

For many survivors in the *High-Decreasing* and *Moderate-Decreasing* trajectories, 'hope' was deeply intertwined with a sense of self-efficacy. Many of these

**Table 1.** Demographic information of the participants.

	M (SD) or n (%)
<b>Age</b>	23.13 (2.75)
<b>Race/ethnicity</b>	
Non-Hispanic Black	13 (86.7%)
Hispanic	2 (13.3%)
<b>Marital Status</b>	
Unmarried, not cohabiting	12 (75.0%)
Married, living apart from spouse	4 (25.0%)
<b>Received Public Assistance*</b>	
Yes	15 (93.8%)
No	1 (6.3%)

\*Public assistance includes unemployment insurance, Supplemental Security Income, welfare, and food stamps.

**Table 2.** Themes.

Themes
1. Hope
2. Adaptive vs maladaptive avoidance
3. Delayed Emotional Processing
4. Acceptance, Finding Meaning and Being in the Moment
5. Coping strategies

survivors were able to hope for a better future, because they possessed a confidence that they would be able to meet the goals they set out for themselves and bring the future they hoped for to fruition.

In contrast, the two interviewees in the *High-Stable* trajectory expressed intense hopelessness about the future and a deep longing for the past.

Nothing will be the same again. (Survivor with *High-Stable* PTSS trajectory in F3)

### 3.1.2. Adaptive vs. maladaptive avoidance

There was a reluctance to talk about Hurricane Katrina among all the participants during the F1 interviews. Regardless of their trajectories, almost all of the survivors said that talking about the hurricane depressed them and reminded them of the traumatic experience, expressing their view that it was better for them to move on instead of talking about it.

Now and then, I will cry. But it's not as bad as it used to be because, at that time, I could not sleep ... I would not want to talk to nobody about it because it was like just something that I wished would have never happened. (Survivor with *High-Decreasing* PTSS trajectory)

This reluctance to talk about the hurricane among survivors affected help seeking, as most of the survivors in this sample either discontinued therapy or did not seek psychological support at all.

I stopped going (to the therapy). I'm a very stubborn person so if I don't want to talk about something I just don't talk about it. I think that didn't help the situation. Like I'm one of those people to keep it shutting down. Like if you constantly ask me about something that I'm telling you, I don't want to talk about then I just at that point ignore you and you know, I don't want to be rude to people. I just change the subject to find something else to talk about it, you know. So, I think that that kind of, me being the way I am kind of affected the situation. (Survivor with *High-Decreasing* trajectory)

Interestingly, during the F3 interviews, most of the participants recognised that avoiding discussion of the hurricane during its short-term aftermath was a mistake and that they would request psychological support immediately after the hurricane if they could go back in time.

I did not seek any treatment for mental health right after Hurricane Katrina. But I needed it. I think sometimes it's healthy to talk to somebody. (Survivor with *High-Stable* PTSS trajectory)

### 3.1.3. Delayed emotional processing

After Hurricane Katrina, many survivors had to start a new life from scratch. Almost all of the survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS

trajectories shared at F1 that they could not fully experience their emotions because in the immediate aftermath of the hurricane they were trying to compensate for their losses and trying to deal with practical issues, such as finding a new place to live, finding a job, and keeping everyone in the family safe.

For example, a survivor with *Moderate-Decreasing* PTSS trajectory discussed how the challenges of child-rearing consumed her daily life.

I just didn't have the time. I didn't have the time to do (feel) it. Always go, go, go. Work, work, work. I just never had the time to do it. Just so busy worrying about them and making sure that they have everything that they need. I mean, when you're a mom, you don't focus so much on yourself. You're there, but you're like, 'I got to make sure these children are okay.'

Another survivor with *High-Stable* trajectory stated how overwhelming it was dealing with so many practical issues such as moving, facing other disasters, financial and health issues at the same time:

It was the overwhelming of everything, just adjusting to the moving situation, adjusting to coming out of one storm, going into another storm, can't find a job, the health issues with my kids. It just was too much for one person to handle. I think one time I was about to lose my mind.

However, one of the survivors with *High-Stable* PTSS trajectory later reflected in their F3 interviews that at the time of their F1 interviews she had not been fully aware of the stress she had been facing in the aftermath of the hurricane, and almost all of the survivors were proceeding with emotional processing by F3.

I never realized how much stress and how many things were taking a toll on me. I need to get up and realize that this is not going to change at all unless I make an effort to change it. It's not going to happen. And me complaining is not going to help my kids eat. It's not. It was a time they wouldn't give me food stamps for my kids, and my kids didn't have any medical insurance. They didn't have anything that they had just left in New Orleans. And it was hard, so I dealt with it.

### 3.1.4. Acceptance, finding meaning and being in the moment

In our analysis, we recognised that survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories tended to be more accepting of the hurricane and its damage than those in the *High-Stable* PTSS trajectory. Some survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories reported a sense of blessing because they survived, and their loved ones were healthy. Additionally, participants with these trajectories tended to state that they chose not to worry so much about issues that they had no



control over. For instance, a survivor with a *Moderate-Decreasing* PTSS trajectory shared her experience with us with these sentences:

I'm better. I don't too much stress about the loss of everything because I know that's material things and, you know, some of them can be gotten back and just some of them they're gone, you know, for good, but I'm just blessed that my family and everybody is okay, my kids, myself made it out okay and that's all I'm really worried about, you know. That was a major concern.

Some of the survivors stated that after the hurricane, they felt like they had a second chance in life and that everything happens for a reason.

Katrina gave me more faith. That, I mean, I had a second chance in life, and it gave me a different outlook on a lot of things. So, I'm very grateful. I don't regret anything in life. I think anything that happens now, happens for a reason, in the beginning, I used to regret it. I regret doing this or regret, I just, my whole attitude was just so nasty and funky. Now it's different. I don't regret anything. I just feel like everything that happens. It has its purpose and there's a reason why it happens. (Survivor with *High-Decreasing* PTSS trajectory)

To be honest with you. I just deal with it. I would say it's life. It happens. You have your ups and your downs. Just deal with it. (Survivor with *Moderate-Decreasing* PTSS trajectory)

A survivor with *Moderate-Decreasing* PTSS trajectory mentioned that she started to be more mindful about 'the staying in the moment' and stopped worrying about daily-life issues of which she had little control.

I honestly – I know this is going to sound crazy, but I try not to worry too much about anything anymore. I think it's because I've been through so much. Like I worry when something happens, and I feel like I have to worry. Even with everything that's going on the news about the black kids being shot, and that scares the heck out of me, don't get me wrong – but I feel like I've done all that I can do in that area. I've told you what you can do, but I feel like I can't stress myself to the point that I'm sick, worried about what might happen. So, I mean just everyday things, just hoping that my kids are always healthy, that they're not hurt, and that they know the right thing to do. But that's it. Like I don't worry on a day-to-day basis because it's out of your control, honestly.

It was evident that some survivors with *High-Decreasing* and especially *Moderate-Decreasing* PTSS trajectories were finding value and living in the moment. They were attempting to gain self-empowerment and learning how to breathe to calm themselves. Additionally, those survivors mentioned that they found value living in the moment as well.

I just like to go and enjoy you, only live once and you got to enjoy life and that's what I'm doing right now.

I'm enjoying life. I can't live day by day stressing and worrying about, oh, well it's going to go and this and that. I mean because life is too short. That's why I say since Katrina I can see. I've been blessed. As I've seen my whole life has changed for the better because before Katrina, I was dependent on my family a lot. When Katrina hit, you were homeless, you have nowhere to go. I was like that then, but then once I got on my feet, got a job and was like, you know, you can do this, no matter what, you can do this. And then my whole life just changed and it's just different now. (Survivor with *Moderate-Decreasing* PTSS trajectory)

In addition, some survivors stressed the importance of staying in the moment, continuing their lives in a disciplined way, pausing and self-regulation with breathing exercises for their well-being.

I mean, it just prepares you. It prepares you for what could happen. It just gives you a sense of always staying on your toes at the moment, always having some put to the side. You just never know. Hurricane season, you just never know if they going to have another one like that. (Survivor with *Moderate-Decreasing* PTSS trajectory)

Just trying to be diligent and trying to be, I guess just disciplined, I guess is what I was trying to say. Just trying to figure out, that this is what you need to do. You need to stay on track and not take any detours, you know. (Survivor with *Moderate-Decreasing* PTSS trajectory)

I do yoga, I do Pilates, a deep breath ... It helps me a lot. (Survivor with *Moderate-Decreasing* PTSS trajectory)

Unlike survivors with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories, survivors with *High-Stable* PTSS trajectories were struggling to accept the situation and continue their lives. They tended to express sentiments of unfairness that they had experienced this situation and found it challenging to be mindful of the hurricane and after-disaster life for them.

I don't believe this is happening. I don't believe I'm at this point. How did I get here? Why isn't anyone helping me? And for a while I blamed everything. I was like well it's not fair. And I sound like a four-year-old. It's not fair. (Survivor with *High-Stable* PTSS trajectory)

### 3.1.5. Coping strategies

For many survivors, temporary displacement and the general uncertainty of post-disaster life (F1) negatively impacted well-being. However, survivors with more social support (most often those in the *High-Decreasing* and *Moderate-Decreasing* trajectories) tended to report that they felt capable of handling this stressful situation.

I got a lot of help. The schools, the churches for my kids and stuff. And I appreciated it. I did get a lot of help for my kids. They bought them clothing, toys, whatever I asked for, they gave me. They would bring us food, and clothes, call us to see if we needed anything, how we were getting around with my kids. (Survivor with *High-Decreasing* PTSS trajectory)

The role of social support was also reflected in the experiences of children. Participants also described how children who they perceived as having received positive psychological support from families, friends and teachers coped better with the aftermath of the hurricane.

Honestly, my daughter did well. Cause I thought it was going to be traumatic for her to leave her old friends to go to a new school and a new state. But she had my cousin, and they are a month and four days apart. They are close even though she lives out of state. So, she introduced her to all her friends. We keep her busy. Like here she's on two dance teams and out there she did cheerlead. You have to keep them busy. But her grades didn't slip. She picked her grades up in Georgia. I didn't have any behaviour problems. I have some family members I've talked to whose children started the behaviour issues and talking back and they went to a therapist. They are dealing with the stress from the hurricane, but I didn't have any of that. (Survivor with *Moderate-Decreasing* PTSS trajectory)

The importance of social support persisted (particularly for those with *High-Decreasing* and *Moderate-Decreasing* PTSS trajectories) over time. At both time periods, these survivors reported seeking opportunities to relax by reading and meeting with friends expressed beliefs about being able to cope with this situation. In contrast, survivors with *High-Stable* PTSS were less likely to have robust social networks and struggled to develop coping strategies, in part due to feeling isolated and unable to ask for help.

I didn't know what to do to cope. I needed help. I was afraid to ask for help because of the area we were staying in. It was uppity. You didn't come outside. It was like I was a prisoner in my own home.

### 3.2. Narrative analysis

Below we present three case studies, each chosen as illustrative of the three different trajectories. We indicate (in **bold underlined**) where parts of participants' narratives directly reflect the themes identified in our thematic analysis.

#### 3.2.1. Case study 1: Moderate-Decreasing trajectory

Corinne grew up in New Orleans and at the time of Hurricane Katrina was living in her family's house uptown with her mother, aunt, and baby. She and her family evacuated New Orleans before the storm but were able to return relatively quickly because their neighbourhood was not flooded, and the family

house sustained minimal damage. However, at the time of the first interview, Corinne was residing in Houston where she was finishing an internship and trying to decide whether she and her boyfriend would return to New Orleans or not. Overall, she describes her experiences with the storm as 'not that bad.' In part because 'all [of her] family, all [of her] friends evacuated,' she did not know anyone who suffered any injuries because of the storm. She described feeling like she was 'pretty much' able to maintain control over her life post-Katrina. Ultimately, she and her boyfriend decided to stay in Houston, where they were married and had twins. While in Houston, Corinne did not experience any racism or discrimination ('I've never encountered any racism or discrimination').

Corinne had a strong social network that helped to buffer her from the adverse impacts of the storm (**cop-ing strategies**). She was not separated from her family until she decided to move to Houston with her boyfriend and their son. Her mother and her aunt helped her to navigate the federal aid system, and they 'got the money [from FEMA] and then gave it to [her].' Corinne also benefited from family support throughout her life. She describes having a 'good time' in her childhood and being close with her mother. She was less close to her father, who lived 'in a different state' but provided financial support and 'sent her through ... private school from kindergarten through twelfth [grade].' Prior to the storm, her mom and aunt helped to raise her son when he was an infant. For example, her mother worked at a daycare centre affiliated with a local university and her son was 'able to go there with her.' Likewise, her mother's position allowed her to go to college 'for free' until she decided to switch to vocational school.

Corinne's life after Hurricane Katrina was not without hardship. At the time of the second interview, Corinne was a single mother of three, having married and divorced her boyfriend of many years, and had returned to New Orleans where she was living next door to her recently retired mother. She experienced 'verbal [and] physical abuse' from her ex-husband that led her to leave her marriage and return home to New Orleans. She also describes many challenges related to parenting ('My children are not easy children') including behavioural and psychological difficulties ('the troubling teens'). While she described her life as 'all over the place' she also said she was 'managing it' and in her interviews talked about a number of coping techniques that she employs, including 'breathing through it' and 'praying' (**self-regulation**). Throughout Corinne's interviews she conveys a sense of self-efficacy and confidence in her ability to 'deal with a lot of stuff ... and handle anything' (**hope**). The core narrative identified in Corinne's case was 'surviving despite the catastrophe,' which showed itself often in her story. The prominent

tone of Corinne's narrative was one of self-sufficiency. She identified factors pre- and post- Katrina which helped her to maximise her independence and autonomy. For example, she mentioned that she did not receive the help she needed after the storm, Corrine said that her 'mom raised [her] to be independent.'

### 3.2.2. Case study 2: High-Decreasing trajectory

Desiree is a mother of three children (all of whom were under 10 years of age at the time of Hurricane Katrina). When she heard about the mandatory evacuation, she and her extended family caravanned to an uncle's home in Baton Rouge, thinking they'd be able to return home shortly. While driving back to New Orleans, they were stopped by a police officer and sent back to Baton Rouge because 'because [New Orleans] was under water.' Realising that she was not able to go home was challenging, especially because she did not want to live in someone else's house. She describes this as the toughest part of the experience.

Central to Desiree's narrative is the social support she received (**coping strategies**). After a short time in Baton Rouge, she and some of her family moved to Texas. In Texas, Desiree 'felt relieved' and 'got settled.' She received support from her family, but also from the government (with FEMA subsidising some of her housing), and from her new community. A local hotel allowed her and her family to stay for free when they first arrived, and the schools and churches helped get 'clothing, toys, whatever [she] asked for.'

While Desiree liked Texas, after about a year 'everybody [in her family] was saying they was going back home' and so she decided to move back to New Orleans. Desiree found that things were more difficult upon returning to New Orleans than they had been in Texas and described herself at that time as 'in control [of her life] but not in control enough.' After a number of moves around New Orleans, by the time of the second interview Desiree had moved with her children to a different neighbourhood that she described as 'perfect.' She felt safer in her new neighbourhood and less concerned for her children and was friendly with her neighbours. At the time of the second interview Desiree's life was not without stressors, one of which included a chronic autoimmune condition. However, she had health insurance, 'loved [her] doctors,' and had 'family that helps' if she is not feeling well, either physically or mentally. Between the two interviews, Desiree had met many of her goals, including finishing college and starting a new job as a medical assistant. She took great pride in her children, who have stayed 'out of trouble' and were doing well in school. The core narrative of Desiree's story was 'getting back control of her life.' Her struggle to regain control of her life was central to Desiree's story

and frequently mentioned. The main tone of Desiree's story was 'feeling hope and having purpose for the future.' Desiree had set new goals for herself, including saving up to buy her own home and making sure her children finish school (**hope**). At the time of the second interview, Desiree was hopeful about her future. She described feeling 'in control' of her life and confident that if things were to ever 'spiral out of control' that she will be able to handle the situation.

### 3.2.3. Case study 3: High-Stable trajectory

Yvonne, a mother of three, did not leave New Orleans during Hurricane Katrina. She chose not to evacuate with the rest of her family because 'her son's father had him and [she] was not leaving New Orleans without him.' By the time she met up with her son (her only child at the time), it was too late to evacuate. She describes her experience in the storm as 'horrifying,' with water 'coming up towards [the] house' and 'people running in the streets telling [them] to go to [higher] ground' Yvonne and her son were able to stay together in the 'cramped' evacuation centre, where they sheltered for five days with hundreds of other people. Ultimately the shelter began to flood, and they were moved by the National Guard to a bridge where they camped for a day and a half until they were moved to an Army base in Texas. There Yvonne described being 'treated [like they] were aliens' and that she had her belongings searched and had to wait hours for food and water for her son. Six months and multiple relocations later, she and her son were placed in a home in Texas.

Yvonne struggled to find stability during this time, in large part because she felt like she had little support. The support she did receive from the Red Cross and FEMA was limited, or in some cases 'nothing.' She also felt let down by the community, or lack thereof, in Texas: 'But certain churches out there in Texas was like, once you move in[to] your house we will help you with furniture. Girl, that was a lie. We would call and say we need stuff. They wouldn't call us back.' While Yvonne described her family as very supportive, 'during that storm everybody was split up.' She did not know anyone in Texas, did not have a car, and did not have a job, dramatically limiting her ability to build any new social connections. Her feelings of isolation were exacerbated by the racism that she experienced in Texas, and discrimination she faced because she came from New Orleans. These experiences lead to feelings of frustration and resentment that would persist over the years (**hopelessness, coping strategies-lack of psychosocial support**).

Yvonne's lack of social support was a critical difference between her narrative and that of Desiree. Further, Yvonne faced a number of additional hardships after Katrina, including the fact that she was

pregnant at the time of Katrina, but did not know. Her daughter's father would go on to be abusive, and over the years between interviews, two of her children faced physical and mental health issues, and the family lived through multiple major hurricanes. Collectively, these experiences were incredibly overwhelming, and because of facing multiple stressors with lack of psychosocial resources, such as coping skills (**coping strategies**) and self-efficacy, she sought mental healthcare: 'adjusting to the moving situation, adjusting to coming out of one storm, going into another storm, can't find a job, the health issues with my kids. It just was too much for one person to handle' (**adaptive avoidance**).

At the time of the second interview, Yvonne resided in Florida in a neighbourhood that felt 'like a community, a family.' In Florida, she felt more supported by her neighbours and more 'stable.' However, she also described a persistent 'trust issue' stemming from her struggles finding support after the storm: 'People say that they will help, but are they gonna help?' (**hopelessness**). This has led her to be more 'self-sufficient,' which she describes as a good thing ('I like that about the new me'). But she also acknowledges that she carries an 'anger' with her about Katrina, and her experiences after the storm.' The core narrative identified in Yvonne's story was one of 'ongoing uncertainty and instability.' The key tone of Yvonne's story was 'feeling isolated and hopeless.'

## 4. Discussion

The purpose of this study was to explore the varied psychosocial resources across survivors with different PTSS trajectories (High-Decreasing, Moderate-Decreasing, and High-Stable) after Katrina Hurricane. Overall, we found that psychosocial resources including 'Hope,' 'Adaptive vs maladaptive avoidance,' 'Delayed Emotional Processing,' 'Acceptance, Finding Meaning and Being in the Moment,' and 'Coping strategies' among the qualitative sample did differ in some dimensions aligned with the quantitative trajectories. However, it was also clear that these psychosocial resources operated in context. That is, the extent and effectiveness of survivors' psychosocial resources were influenced by factors at other socio-ecological levels, including economic hardship and racial discrimination, suggesting an interplay between individual, social, and community influences in shaping post-disaster wellbeing.

### 4.1. Main findings

#### 4.1.1. Survivors with High-Decreasing trajectory

One of the main factors that differentiated survivors with *High-Decreasing* PTSS trajectories was that they carried a sense of hope even at the first interview

(F1) when many of them were experiencing elevated psychological distress. As illustrated in the case study of Corinne, these survivors described hope and goals for the future, especially related to education and finding better jobs.

During the F1 interviews, nearly all survivors, including those within the *High-Decreasing* PTSS trajectory, mentioned that instead of talking about the hurricane it was better for them to move on. For many, this resulted in reduced psychological support seeking. Later during the F3 interviews, many participants in the *High-Decreasing* PTSS trajectory reflected that this may have been a mistake, and that they may in fact need psychological support. Regardless, most participants were still unable or unwilling to seek care as they were dealing with more pressing practical and financial challenges that superseded their emotional needs. Many participants in the *High-Decreasing* PTSS trajectory attempted to manage their emotional needs on their own with finding meaning in the life, being in the moment, and regulating emotions in the present. However, the ability to seek out these coping strategies was often related to having access to a robust social network, from whom survivors could seek support. In this way, survivors in the *High-Decreasing* PTSS trajectory responded to their psychological needs differently from their counterparts in two key ways: first, they were able to recognise a need for psychological support, and second, even if they were unable to seek professional care, they sought alternative strategies to address their psychological needs, often relying on the assistance from family and friends to support this process. A final difference that set survivors with *High-Decreasing* PTSS trajectory apart from the other survivors was their commitment to 'accepting the situation and moving on.' Even shortly after Katrina (F1), many participants in this trajectory stated that they had accepted the situation and were trying to gain control back over their lives. This sense of control may have served as a protective factor against anxiety (Remes et al., 2018).

A number of critical differences in the lived experiences and social situatedness of survivors in the *High-Decreasing* PTSS trajectory may partially explain why these survivors had improved psychosocial resources compared to others. In the current literature, it is well-documented that social support is a significant protective factor against the distress (Ozer et al., 2003). After disasters, social relationships and social support tend to be disrupted (Weems et al., 2007). However, higher levels of social support may decrease the negative impacts of disaster stress on anxiety and depression (Park et al., 2021). Our findings support the findings of these studies. Survivors in this trajectory described high levels of social and family support, and most of them stated that during the relocations,

they were still with their families. This may have helped them get through this disaster with less harm than other survivors (Brewin et al., 2000; Simon et al., 2019). As was the case with all of the survivors, the uncertainty and instability associated with residential displacement impacted mental health of the survivors with *High-Decreasing* PTSS trajectory negatively. However, they were hopeful for the future and, having hope in the ability to cope with the problems is positively associated with perseverance when faced with obstacles and stressful situations (Snyder, 2002). They believed that they could cope with this stressful situation, they did not give up, and successfully found ways to cope, for example by exercising or meeting with friends and/or families.

#### 4.1.2. Survivors with Moderate-Decreasing PTSS trajectory

Survivors with *Moderate-Decreasing* PTSS trajectories shared similar experiences with survivors with *High-Decreasing* PTSS trajectories. For example, while they also reported feelings of hope, and sought to be present in the moment and accepting of their reality, they too avoided talking about the hurricane, and delayed emotional processing because of the responsibilities that they had to take such as finding a job or new residence.

However, there were notable differences that may have contributed to developing resilience. For instance, in current literature, there is significant evidence that resource loss has a destructive impact on positive post-disaster adjustment (Bakic & Ajdukovic, 2021; Zwiebach et al., 2010). Our findings support the results of these studies. Survivors with *Moderate-Decreasing* PTSS trajectory accepted the hurricane and its damage, like survivors with *High-Decreasing* PTSS trajectory, but they may have experienced less impact in the immediate aftermath of the hurricane and experienced less disruption in their lives in the shorter term. According to Bakic and Ajdukovic (2021), individual, interpersonal and psychosocial resources, such as accepting the problems and gathering emotion regulation, social support from family members and friends, having a purpose, and sense of control over one's life have an impact on positive adaptation after a disaster. Our findings showed that, in addition to having greater access to family and social support and resources, survivors with *Moderate-Decreasing* PTSS trajectories reported finding jobs and places to live in a shorter time frame than other survivors, and therefore more quickly regained their independence and sense of control. Likewise, as described by the case of Corinne, survivors in the *Moderate-Decreasing* trajectory focused on setting goals like returning to school, helping others, and growing in their careers, all of which appeared to facilitate coping, which may have increased the chance

of developing resilience for survivors with *Moderate-Decreasing* trajectory. Importantly, survivors in the *Moderate-Decreasing* trajectory still experienced significant hardship associated with the storm, and many participants used avoidant coping strategies such as purposefully not going back to where they had lived before the hurricane or avoiding talking with people about the situation in the immediate aftermath.

#### 4.1.3. Survivors with High-Stable PTSS trajectory

Compared to other survivors, survivors with *High-Stable* PTSS trajectories had different experiences in using psychosocial resources and experiencing socio-ecological challenges. During the F1 interviews, like other survivors, these survivors were avoiding talking about the hurricane and not seeking psychological help. However, in F3 interviews, the two participants in this trajectory reflected that they realised they needed, and wished they had sought, psychological support. At both time points, participants in this trajectory continued to struggle to accept the situation, found it hard to continue with their lives and find purpose in life, and continued to express a sense of unfairness about what had happened.

Unlike the other survivors, survivors with *High-Stable* PTSS trajectory reported losing the social support they had [before the storm], and not being able to find support in their new destination. Also, another issue that seemed especially pertinent to this group was discrimination and racism. According to Paradies et al. (2015), there is a positive correlation between experiencing racism and a range of adverse psychological outcomes, including depression, anxiety, and posttraumatic stress disorder symptoms. Survivors with *High-Stable* PTSS trajectory mentioned that they experienced racism and discrimination and they felt like 'aliens' in their own county. It is possible that such experiences led to declines in some psychosocial resources (e.g. hope), and rendered others (e.g. coping skills) less effective. Again, this finding speaks to the importance of considering the interplay between factors at different socio-ecological levels in shaping post-disaster psychological trajectories.

As in a prior analysis of the RISK F1 qualitative data (Lowe, Chan, et al., 2011), separation from family members, and concern about loved ones' lives and future during the hurricane contributed to survivors' reports of anxiety, depression, and PTSS. Again, this shows that there are other factors beyond individual-level psychosocial resources that shape post-disaster resilience. Along similar lines, we observed that more post-disaster stressful life events such as physical health issues, pregnancy complications, and abusive partners, appeared to be more common among the *High-Stable* PTSS trajectory participants compared to others. Although not the focus of the current study, this

observation again speaks to the importance of considering contextual factors in understanding lived experiences underlying post-disaster PTSS trajectories.

#### 4.2. Strengths and limitations

This study offers a novel analysis of in-depth qualitative data gathered over time, comparing and contrasting the experiences of survivors with different trajectories, *High-Decreasing*, *Moderate-Decreasing*, and *High-Stable* and over time (1- and 12-years post-disaster). The analyses were conducted rigorously and transparently, by a diverse research team of academics and clinicians.

This study has some limitations. Firstly, the two time points over which data was collected (1 and 12 years after the hurricane) are far apart and we have limited information about participants' experiences in between. Secondly, we focused on PTSS rather than a broader range of mental health impacts. Thirdly, participants were all part of a previous sample of low-income parents attending community colleges in New Orleans prior to the hurricane. Therefore, there may be some limited transferability of the current study's findings outside of this demographic group. Fourth, the sample were all young women attending community college at the time of Katrina and who were not cohabitating with a partner or spouse, therefore we cannot ascertain the potential transferability of our findings to Katrina survivors in general. Because PTSD trajectories were identified after data collection, subsamples for each trajectory group were small. In particular, we were able to include only two participating in the *High-Stable* trajectory. As such, we may have missed important alternative experiences, although these results might nonetheless shed light on factors to examine in future multi-method disaster research. Finally, in this study we have focused on psychological factors in order to address an important gap in previous literature. However, we acknowledge that other individual-level factors such as personality traits, previous mental health problems, sleep, and nutrition, are important to consider, despite being outside of the scope of the current study.

Future longitudinal research could address these important limitations by gathering data at more frequent time points, carefully considering the interplay between other socio-ecological factors and psychosocial resources and examining a broader range of mental health indicators.

#### 5. Conclusion

In this study, we aimed to explore the psychosocial resources of Hurricane Katrina survivors with *High-Decreasing*, *Moderate-Decreasing* and *High-Stable* PTSS

trajectories over two different time-points, 1 year and 12 post-disaster. Participants across all the trajectories shared many experiences, although participants with *High-Stable* PTSS trajectories reported more ongoing challenges, less social support, and more difficulties accepting what had happened and reintegrating back into their previous lives. The findings highlight the need to monitor individuals after disasters and offer more support to those who do not appear to be recovering over time.

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#### Data availability statement

The data that support the findings of this study are available from the corresponding author (ST), upon reasonable request. The data have not been made publicly available due to the personal and sensitive content of the participants' accounts.

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