



UNIVERSITY OF PADOVA

**Department of General Psychology
Department of Philosophy, Sociology, Education and Applied Psychology**

Bachelor's Degree Course in Psychological Science

Final dissertation

**Navigating Adversity After Natural Disasters:
Community Resilience and Coping Among Older Adults**

Supervisor Professor:
Teresa Maria Sgaramella

Candidate: Tuna Kantar
Student ID number: 1225236

Academic Year: 2024-2025

Abstract

In the wake of disasters, resilience becomes a vital determinant of how individuals and communities adapt to adversity. This thesis explores resilience through a systemic lens, recognizing it not as a fixed trait but as a dynamic, multi-level process shaped by interactions among individuals, social networks, and broader environmental and institutional systems. Focusing on older adults, a population uniquely positioned within both vulnerability and adaptive capacity, the study examines how personal coping mechanisms interface with community structures to support recovery.

Grounded in Systems theory, the research draws on four major models: Trajectory-Based Individual Differences Model of Resilience, Disaster Resilience of Place (DROP) Model, the Systemic Resilience Model (SyRes), and the Multi-System Model of Resilience (MSMR). These models collectively highlight how resilience emerges from the interplay of internal capacities, relational supports, and external socio-ecological resources. Special attention is paid to coping strategies such as emotional regulation, spirituality, meaning-making, and community engagement, all of which are embedded within, and influenced by, larger systems of meaning and support.

By adopting a systemic approach, this thesis positions resilience as both an individual and collective phenomenon. It argues for a holistic framework of disaster recovery that not only supports personal adaptation but also strengthens the structural and relational systems that enable communities to withstand and transform in the face of adversity. This integrated perspective offers valuable insights for disaster response policy, mental health interventions, and age-inclusive resilience planning.

Keywords: resilience, adversity, disaster, coping, community

Table of Contents

1. Introduction - Framing Resilience: Conceptual Foundations and Relevance for Older Adults in Disaster Contexts	3
1.1 Framing Resilience in the Context of Natural Disasters.....	5
1.2 Resilience and Vulnerability in Older Adults After Disasters.....	5
Chapter 2 - Theoretical Perspectives on Resilience: Definitions, Dimensions, and Conceptual Evolution	7
2.1 Resilience as Recovery or “Bouncing Back”.....	7
2.2. Resilience as a Process	8
2.3 Resilience as an Outcome	9
2.4 Resilience as a Capacity or Ability	11
Chapter 3 - Models of Resilience	17
3.1 Trajectory-Based Individual Differences Model of Resilience	17
3.2 Disaster Resilience of Place Model	25
3.3 Systemic Model of Resilience.....	31
3.4 Multi-System Model of Resilience	34
Chapter 4- Bridging Theory and Practice: Resilience and Coping Strategies in Older Adults	38
4.1 Multi-Level Coping Resources Among Older Adults in Disaster Contexts	39
4.2 Critical Reflections and Future Directions on Older Adult Resilience.....	48
4.3 The Future of Assessment and Development of Resilience Measures for Older Adults: Psychometric and Disaster Implications	49
APPENDIX –1.....	55
Multilevel Resources for Resiliency: Intra-individual, Social-Relational, and Structural Capacities and related references	55

1. Introduction - Framing Resilience: Conceptual Foundations and Relevance for Older Adults in Disaster Contexts

Resilience is commonly conceptualized as the ability to navigate and adapt successfully to challenging conditions, including adversity, significant stress, threat, or trauma (Feder et al., 2019). This essential human ability to bounce back or recover from stress (Carver, 1998; Tusaie & Dyer, 2004; all as cited in Smith et al., 2008) has gained prominence as an important interdisciplinary construct, specifically in the context of mounting global disruptions. With natural disasters affecting about 200 million individuals annually, the resulting human, economic, and material damages frequently surpass the capacity of communities to cope effectively (Guha-Sapir, Hoyois, & Below, 2016; United Nations Office for Disaster Risk Reduction, 2009; as cited in Bakić, 2019). From a psychological standpoint, resilience is frequently defined as a dynamic process involving the preservation and restoration of psychological wellbeing after facing hardship (Bakić, 2019) or a positive adjustment following substantial adversity (Luthar et al., 2000, p. 543, as cited in Bakić, 2019). It involves individuals' successful way of negotiating, adjusting to, or managing substantial stressors by drawing upon available assets and resources (Windle, 2011, as cited in Cowden et al., 2016). In broader contexts such as public health and disaster risk reduction perspectives, resilience refers to the ability of systems, communities, or societies facing hazards to withstand, absorb, accommodate, adapt, undergo transformation, and recover from their impacts efficiently and within an appropriate timeframe (Matsukawa et al., 2024; United Nations Office for Disaster Risk Reduction [UNDRR], 2009, as cited in Ostadtaghizadeh et al., 2015). Moreover, systems-oriented and ecological perspectives define resilience as a system's ability to absorb disturbances and reorganize in a way that preserves its fundamental structures and functions (Walker & Salt, 2012, as cited in O'Connell et al., 2015), reflecting an essential capacity to withstand shocks while retaining functioning effectively. Emphasizing the collective dimension, social and community resilience refers to groups' or communities' ability to withstand external pressures and disturbances caused by political, social, and environmental shifts, linking adaptive capacities to positive recovery trajectories post-disruption (Adger, 2000; Norris et al., 2008; all as cited in Quinlan et al., 2016).

The conceptual understanding of resilience has evolved considerably, transitioning from its early foundations in developmental psychology, which emphasized stable individual traits or characteristics in children who experienced adversity (Luthar & Brown, 2007; Masten et al., 1990;

all as cited in Bakić, 2019). Initial research focused on individual traits believed to underlie resilience, including hardiness, sense of coherence, and ego resilience (Antonovsky, 1979; Block & Block, 1982; Kobasa, 1979; all as cited in Bakić, 2019). However, there has been a major shift in the field toward viewing resilience as a dynamic, ongoing process, emphasizing "how" adaptive responses lead individuals and systems to achieve positive outcomes (Bakić, 2019). This contemporary perspective conceptualizes resilience as more than just the absence of negative outcomes; it is recognized as a distinctive and active process (Bonanno, 2004, as cited in Stainton et al., 2018). An ecological systems perspective is increasingly emphasized in research, underscoring the complex interplay between individual mechanisms and wider social, community, and societal systems (Liu et al., 2017; Ungar, 2011, as cited in Van Kessel et al., 2015). This broader perspective incorporates the concept of "bouncing forward", which implies growth and transformation beyond the pre-adversity state, in contrast to bouncing back, which denotes returning to the state prior to the disaster. Bouncing forward includes multiple resilience capacities, including absorption, persistence, learning, and transformation (Manyena et al., 2019).

Although theoretical progress has been made, key debates and complexities continue to shape the resilience literature, underscoring its interdisciplinary foundations and the lack of a universally agreed-upon definition (Karairmak, 2007; Quinlan et al., 2016; Van Kessel et al., 2015). One of the core conceptual tensions in the literature revolves around defining resilience as a stable trait, an evolving process, or a measurable outcome. While acknowledging that resilience can be expressed as a trait-like capacity or as a measurable outcome, this thesis emphasizes its nature as a dynamic, adaptive process. A key distinction often made in the literature is between individual and community resilience, recognizing that while individual resilience is important, it does not necessarily translate into collective resilience at the community level. Instead, it forms a foundational component of broader societal resilience (Norris et al., 2008; Patterson et al., 2010; all as cited in Van Kessel et al., 2015). Another aspect of the debate concerns whether resilience is a fixed attribute or a continuous adaptive, dynamic capacity (Vella & Pai, 2019). This ongoing variation in conceptualizations highlights the necessity for clear operational definitions to improve research comparability and aid in the development of effective interventions (Luthar et al., 2000, as cited in Liu et al., 2017; Prince-Embury & Saklofske, 2012).

1.1 Framing Resilience in the Context of Natural Disasters

Natural disasters constitute high-stakes environments that rigorously test the conceptual and operational dimensions of resilience. Catastrophic events of this nature serve not only as environmental threats but also as major societal stressors, with the capacity to impair the functioning of entire populations (United Nations Office for Disaster Risk Reduction, 2009, as cited in Bakić, 2019). They represent critical contexts that challenge and illuminate the human potential for resilience, including adaptation, recovery, and transformative growth (Prince-Embury & Saklofske, 2012). Understanding resilience in the face of such intense disruption is imperative, particularly in examining how groups like older adults, who possess both vulnerabilities and strengths, navigate recovery processes (Noji et al., 2016, as cited in Timalcina & Songwathana, 2020). Comprehending the mechanisms and factors that underpin their resilience in these contexts is essential for designing targeted response, recovery, preparedness, and mitigation strategies that move beyond deficit-focused perspectives and acknowledge their capacity as active agents in community rebuilding (Bakić, 2019; Liddell & Ferreira, 2019). This thesis aims to systematically investigate and critically evaluate a range of conceptual models and perspectives on resilience, emphasizing their relevance and effectiveness in explaining disaster recovery among older adults.

1.2 Resilience and Vulnerability in Older Adults After Disasters

Older adults are commonly framed within a deficit model that highlights increased vulnerability in disaster contexts, where they are often perceived in terms of disability and decline in functional capacity (Gibson, 2006; Rothman & Brown, 2007; all as cited in Liddell & Ferreira, 2019). Research indicates that the heightened vulnerability of older adults arises from a confluence of age-related factors, including deteriorating physical function and mental health, chronic medical conditions, loss of independence, economic disadvantages such as poverty or limited income, inadequate physical living environments, restricted access to social support and resources, and geographic isolation (Powell et al., 2009, as cited in Brockie & Miller, 2017). Such layered vulnerability is further demonstrated by the significantly elevated disaster-related casualty rates among older adults in comparison to younger populations (Gibson, 2006; Jenkins et al., 2007; all as cited in Liddell & Ferreira, 2019). Despite heightened risks, older adults also demonstrate significant flexibility and adaptive capacity, enabling them to navigate adversity effectively

(Staudinger et al., 1993, as cited in Karairmak, 2007). They exhibit a notable capacity for recovery (bouncing back) following hardship (Binder et al., 2014; Vernberg et al., 2016; Warchal & Graham, 2011; all as cited in Almazan et al., 2019). An example of this is how older adults' prior disaster exposure may contribute to their internal coping mechanisms, allowing for easier adjustment to post-traumatic stress (Tsunno et al., 2014, as cited in Almazan et al., 2019). This idea, which Ferraro (1997) labeled as the stress "inoculation hypothesis", suggests that previous experiences with natural disasters serve as a protective factor, reducing their emotional distress in response to future disasters (Brockie & Miller, 2017). Therefore, the attributes of life experience, established coping strategies, and a mature perspective can function as protective mechanisms during times of crisis and additionally, spiritual beliefs also emerge as a distinct and significant source of resilience (Al-Rousan et al., 2014, as cited in Cvetković & Šišović, 2024; Timalisina & Songwathana, 2020; Wang et al., 2012, as cited in Almazan et al., 2018).

Moreover, the World Health Organization notes that older adults can demonstrate greater levels of resilience than younger individuals, often drawing on their survival knowledge to cope effectively and serve as sources of inspiration to others (World Health Organization, 2008, as cited in Brockie & Miller, 2017). There is, however, a critical lack of systematic inquiry into the ways in which social, physical, and psychological factors interact to shape resilience among older individuals following disasters (Liddell & Ferreira, 2019). Most existing resilience research and measurement tools have been primarily centered on younger populations, often overlooking key factors that are essential to understanding resilience in older adults (Alcayna et al., 2016; Ballesteros & Domingo, 2015; Phelps et al., 2012; all as cited in Almazan et al., 2019). These include extrinsic factors like purpose in life and multi-level social support. This highlights a pressing gap in the field: the need for tailored research and evaluative tools that address how resilience manifests in older adulthood (Li & Ow, 2022). Such insights are essential for shaping interventions and policies that are both effective and tailored to the needs of older adults (Hrostowski & Rehner, 2012).

Chapter 2 - Theoretical Perspectives on Resilience: Definitions, Dimensions, and Conceptual Evolution

2.1 Resilience as Recovery or “Bouncing Back”

An essential part of resilience involves the ability to recover or bounce back from adversity, stress or loss. It can refer to maintaining relatively stable, healthy levels of functioning after disruptive events or a return to homeostasis or in other words, normal functioning. Nonetheless, this suggestion may be over-simplified and that resilience is not only capable of more than just returning to baseline or survival; but it can also encompass obtaining new potencies or bettering and advancing past the previous state (Cvetković & Šišović, 2024; Hrostowski & Rehner, 2012; Liu et al., 2017; Stainton et al., 2018; van Kessel et al., 2015). As it can be seen, this duality in meaning highlights the evolving nature of the concept of resilience and encourages further investigation of its historical and theoretical roots. The concept of resilience has its genesis rooted in physics, pointing out to the materials capability to restore to its original size and shape, following the subjection to deformation or stress (Merriam-Webster, 2018, as cited in Bakić, 2019). As the term evolved into the social sciences, this fundamental meaning has provided significantly to one of the major comprehensions of psychological resilience: the ability to “bounce back” or “recover” from adversity (Bakić, 2019). The etymology of the word “resilience” reinforces this perspective; it stems from the Latin word “resilio”, which means “to bounce back” or “spring back” (Agnes, 2005, as cited in Smith et al., 2008). Similarly, according to Garmezy (1991) and early research in psychology, resilience is conceptualized as the tendency to spring back, rebound, or recoil from stressful or adverse experiences (Jowkar, 2010). Dictionary definitions, like Merriam Webster, similarly reinforce this view by emphasizing the capacity to recover easily from misfortune or change, or to return to an original state after being bent or compressed (Bakić, 2019).

This traditional viewpoint describes resilience particularly as the ability to recover from stress, marked by a relatively rapid return to psychological wellbeing or healthy functioning after the subjection to a difficult, challenging or a potentially unsettling event. A fair few scales, like the Brief Resilience Scale (BRS), were specifically designed to analyse this distinct characteristic of resilience – the capacity to bounce back or recover from stress – differentiating it from measures which center more extensively on the factors or resources that may support and contribute to resilience. From this standpoint, it is apparent that resilience can be seen as a specific path or route of psychological outcome following trauma or loss, in which according to Bonanno (2004), one

experiences minimum to short-lived effect on their day-to-day functioning (Mancini & Bonanno, 2009; Smith et al., 2008). However, while the idea of “bouncing back” remains an important part and a conceptualization that’s historically significant to resilience, modern understanding is frequently positioned in a wider and more dynamic process.

Resilience is now frequently defined not only as the outcome of the recovery, but also as a process that’s dynamic which involves the utilization of mixed resources in order to attain positive adaptation in the course of adversity or risk (Bakić, 2019). This broader perspective concerns multiple ways of adaptation: the maintenance of stable functioning in spite of the event, adapting and adjusting to new conditions, or going through a process of recovery (Jowkar et al., 2010). The complexity of these pathways is reflected in models such as the Multi-System Model of Resilience (MSMR), which clarify this intricacy, seeing resilience as a competence that relies on intra-individual, interpersonal, and socio-ecological resources that interconnect with dynamic coping mechanisms. (Liu et al., 2017; Liu et al., 2020). In the larger context, the capacity to bounce back is an expression/demonstration of this ability and a likely path, however resilience embodies more than simply the returning to the past state; it can also include growth, adaptation, or sustaining functionality (Bakić, 2019; Matsukawa et al., 2024). Regardless of the evolution in approach, the essential idea of moving past the adversity and achieving noteworthy improvement remains pivotal (Stainton et al., 2018).

2.2. Resilience as a Process

A great deal of modern definitions depicts resilience as a dynamic process that involves a multi-layered structure. Over time, many contemporary definitions interpret resilience as a process. This transformation/shift is important since it emphasizes the bold nature of being involved with adversity and underlines the potential for resilience to advance, flourish, and shift over time (Almazan et al., 2018; Bakić, 2019). Perceiving resilience as a process highlights its dynamic nature, meaning that it can diverge within an individual across distinct ages, cycles, terms, and situations (Stainton et al., 2018). This dynamic quality is further stressed by the concept of “fluid risk”, which acknowledges that access to, or the strength of, protective factors may change over the course of a person’s life” (Bell, 1992, as cited in Stainton et al., 2018). The mechanism includes the interaction of individuals with their broader socio-ecological context (Liu et al., 2017). In this process, resources (whether individual or circumstantial, stable or more inconsistent and

diverse) are used to attain positive adaptation in the face of adversity, risk, and disaster (Bakić, 2019). In this context, mechanisms refer to the underlying processes through which protective factors positively influence an individual's psychological well-being or long-term functional outcomes. These mechanisms could act as moderators of a risk factor or mediators of the effect of the risk factor on long-term outcomes (Stainton et al., 2018).

One illustrative example is the Multi-System Model of Resilience (MSMR), which conceptualizes resilience as an interactive and layered construct, that originates from intra-individual, interpersonal, and socio-ecological aspects that engage with trauma (Liu et al., 2017). The MSMR sees resilience as a progressing capability to respond to hardships over time, in which this capability is garnered from a confluence of factors contingent on circumstantial demands and availability of resources (Liu et al., 2020). Whilst prior research has often made a distinction between “resilience” as a dynamic process necessitating adversity and “resiliency” as a personality trait that doesn't necessitate adversity, the literature suggests that both standpoints—trait and state—focus on similar features (Karairmak, 2007). Some modern theoretical models, like the MSMR, attempt to synthesize these perspectives by understanding resilience as possibly involving elements of coping strategies, outcomes, or traits, while drawing attention to its dynamic qualities and the need to observe its progression over time (Liu et al., 2017). Furthermore, the SyRes model also interprets coping through an unpleasant event as a process that activates primary resilience processes and techniques or strategies (Lundberg & Johansson, 2019). Conclusively, the definition of resilience as a process is essential for grasping how individuals as well as systems continue functioning, adapting, or recovering with good outcomes after experiencing substantial adversity (Bakić, 2019).

2.3 Resilience as an Outcome

2.3.1 *Positive Adaptation and Better-Than-Expected Outcomes*

Resilience is also seen and applied specifically as an outcome (Liu et al., 2017). This viewpoint, according to Masten et al. (1990), characterizes resilience by the favorable outcome gained after the exposure to threatening or challenging circumstances (Bakić, 2019). Approaching resilience from the standpoint of an outcome focuses on the positive adaptation or beneficial result of experiencing challenges. The literature uses numerous synonymous terms to refer to this ideal

outcome, including “good outcomes”, “healthy level of functioning”, or “positive adjustment” (Bonanno, 2004; Luthar et al., 2000; Masten & Reed, 2002; all as cited in Bakić, 2019).

All these terms collectively illustrate what is accomplished by an individual or system *after* navigating challenging conditions. This perspective draws specific attention to the successful navigation of risk, threat or adversity, which are considered vital for resilience to emerge. When conceptualizing resilience as an outcome, specifically in the context of disasters, various approaches emerge to determine what qualifies as a suitable degree of positive adaptation. One such perspective hypothesizes that resilience is characterized by *experiencing better outcomes than expected* in adverse situations. In disaster research, this perspective can include the evaluation of psychological outcomes of impacted community members and the identification of individuals who demonstrate relatively better functioning, based on the link between outcomes and various predictors. Nonetheless, a common critique of this “better-than-expected” standard is that outperforming others in a highly distressed disaster-exposed group, might not fully serve as adequate functioning when contrasted with baseline functioning or general population standards. For many scholars, this criterion alone isn’t considered sufficient in capturing the complexity of resilience (Bakić, 2019).

2.3.2 Stability, Emergent Resilience, and Recovery

An additional perspective defines resilience as *maintaining positive functioning regardless of the event*. This perspective proposes that resilient individuals display a relatively stable trajectory of healthy physical and psychological functioning, even though they are experiencing a potentially traumatic and isolated incident, such as a severe threat to one’s life or the death of an immediate relation. This contrasts with circumstances that involve constant adverse environments, where Bonanno and Diminich (2013) introduced the term “emergent resilience” to describe positive adaptation that develops gradually following a reduction in stress. In contrast, resilience in response to single, high-impact events is typically characterized by “little or no lasting impact on functioning” along with continued healthy adjustment. Building on these perspectives, a third way to conceptualizing resilience as an outcome is the emphasis of *undergoing a process of recovery after an adverse event*. This perspective underlines that resilience is seen as the ability to bounce back or the speed at which an individual returns to a satisfactory level of pre-event functioning after hardship. This outlook indicates a trajectory where

functioning might initially drop but is later restored. Building on this recovery-focused view, resilience as an outcome is generally assessed by the *level of well-being and effective functioning* demonstrated following the event. Furthermore, it can also be measured by the *rate at which this level of functioning is attained* following an event characterized by high risk with possible adverse psychological effects. This level/degree of functioning is occasionally evaluated in relation to diagnostic standards. For instance, research on resilience after loss have defined it as a distinct psychological outcome trajectory—independent from patterns like chronic stress or delayed grief—facilitating the analysis of factors contributing to this outcome. Even though the outcome-based approach is a fundamental outlook to comprehend and assess resilience, it coexists with other conceptualizations, like resilience as a capacity, a personality trait, or a dynamic process. Some scholars strive to integrate these concepts, framing positive adaptation or outcomes as an indicator of an underlying capacity of resilience sourced from a range of intra-individual, interpersonal and socio-ecological factors/influences. Assessing resilience as an outcome maintains its status as vital for producing empirical evidence of effective adaptation in the face of adversity (Bakić, 2019; Liu et al., 2017; Liu et al 2020).

2.4 Resilience as a Capacity or Ability

Resilience is also understood and defined as an inherent capacity or ability. This perspective addresses individuals' or systems' intrinsic potential to adapt to, manage or recover efficiently from major trauma, adversity and stress (Bakić, 2019; Cowden et al., 2016; Karairmak, 2010). It isn't only about surviving, it's about exhibiting the capacity to “rebound”, “spring back” or “bounce back” and preserving a healthy and steady level of functioning amid adversity (Bonanno, 2004, as cited in Bakić, 2019, p. 20).

The understanding of resilience as a capacity or ability emerged from the attempts to conceptualize how individuals exhibit positive adaptation in the face of significant hardship or challenging conditions (Bakić, 2019; Jowkar et al., 2010; Karairmak, 2007; Klohnen, 1996). Initial research in this area concentrated on the identification of personal capacities and qualities linked with functioning optimally in response to adversity and disruption (Bakić, 2019; DeSimone et al., 2017; Karairmak, 2007). This work prioritized the exploration of individual characteristics, including resourcefulness, adaptability/flexibility and coping strategies. Core constructs connected with this approach include hardiness, sense of coherence, and ego resilience (Antonovsky, 1979;

Block & Block, 1982; Kobasa, 1979; all as cited in Bakić, 2019). For instance, ego resilience was understood as an evolving and flexible capacity in which individuals modify their behavior and cognition according to environmental conditions, forming the basis for long-term adaptability that inherently involves the navigation of constraints and difficulties (Block & Block, 1980, as cited in Karairmak, 2007; Klohnen, 1996). However initial theoretical frameworks frequently regarded resilience as a relatively stable and fixed personal attribute (Bakić, 2019; Karairmak, 2007). Resilience as capacity or ability remains a central and fundamental aspect of resilience, this approach sees resilience as a built-in readiness or potential within individuals or systems to manage and navigate threatening and challenging situations effectively (Bakić, 2019; Liu et al., 2020). This reflects the foundational capacity to adapt accordingly despite disruptions that endanger survival, functioning, or development (Masten, 2014, p. 10, as cited in Bakić, 2019). Furthermore, the concept of ability or capacity is frequently understood as being intertwined with conceptualizations of resilience as both an outcome and a dynamic process (Ayed et al., 2019; Zautra et al., 2008; all as cited in Vella & Pai, 2019). Capacity serves as the basis and potential that empowers the individual to undertake the dynamic processes of negotiating, adapting to, or managing major trauma or stress (Windle, 2011, as cited in Stainton et al., 2018). This process involves the active engagement with protective factors and resources, which are both internal (such as psychological capacities and intra-individual traits) and external (such as environmental resources and socio-ecological support) (DeSimone et al., 2017; Liu et al., 2020). These capacities allow individuals to use personal qualities such as resourcefulness, flexibility (the ability to inhibit or switch attention) and coping and psychological factors such as self-efficacy, executive function, optimism, emotion regulation, active coping and cognitive reappraisal in navigating hardship (Genet & Siemer, 2011, as cited in Stainton et al., 2018; Horn & Feder, 2018, as cited in Feder et al., 2019). Mobilizing this capacity through the dynamic adaptation facilitates positive adjustment or favorable outcomes, even in the context of risk and adversity. Resulting outcomes may range from the maintenance of stable levels of functioning or preservation of psychological well-being, to exceeding foreseen outcomes given the circumstances, or the acquisition of enhanced capabilities (Liu et al., 2020; Manyena et al., 2019). Therefore, framing resilience as a capacity highlights the fact that capacity is fundamentally linked to the activation of resources across various systems, enabling individuals to efficiently face challenges and attain positive adaptive outcomes (Liu et al., 2020). As the capacity of resilience is multifaceted, it draws upon a diverse

reservoir of adaptive skills and resources. These protective factors, substantially enhance the probability of positive adaptation during periods of challenges or disasters (Bonfiglio et al., 2016). An overview of resilience capacities across intra-individual, social-relational, and social-ecological domains is presented in Tables 1–3. A more detailed breakdown of these capacities is provided in Appendix 1.

Table 1 presents key intra-individual capacities that have been identified in literature as central to resilience.

Category	Subcategory	Key Elements/Examples
Intra-individual Capacities	Self-Perception & Identity	Self-efficacy, self-reliance, sense of mastery, self-esteem, identity continuity, self-control
	Cognitive & Emotional Capacities	Cognitive flexibility, cognitive appraisals, cognitive reappraisal, emotional regulation, positive emotions
	Motivational & Existential Factors	Optimism, hope, perseverance, meaning & purpose in life, spirituality/faith
	Health & Biological Factors	Physical health, mental health, healthy behaviors (sleep, diet, exercise)

Table 1: Intra-Individual Capacities Contributing to Resilience

Table 2 presents key socio-relational capacities that have been identified in literature as central to resilience.

Category	Subcategory	Key Elements/Examples
Social-Relational Capacities	Social Competence (Individual Level)	Empathy, interpersonal skills, help-seeking behaviors
	Social Support & Networks	Support from family, friends, significant others, neighbors (bonding social capital)
	Social Support & Networks	Informal community groups, ‘friendly strangers’ (bridging social capital); emotional & practical assistance
	Trust	Mutual trust within social networks

Table 2: Social-Relational Capacities Supporting Resilience

Table 3 presents key socio-ecological and structural capacities that have been identified in the literature as central to resilience.

Category	Subcategory	Key Elements/Examples
Social-Ecological & Structural Resources	Community Competence	Community participation, collective problem-solving, shared decision-making, empowerment
	Institutional & Structural Supports	Access to healthcare, social services, formal community organizations (linking social capital)
	Environmental & Geographical Factors	Geographic location, previous exposure to environmental risks
	Socioeconomic Resources	Economic capital (wealth, income), social status, access to essential services, education

Table 3: Social-Ecological and Structural Resources Supporting Resilience

Important factors in the domain of intra-individual capacities, presented in Table 1, include: Self-efficacy, the belief in one's ability to perform tasks and achieve desired outcomes, which promote a sense of control over one's environment; Self-reliance, the dependence on one's own resources and abilities rather than external help, fosters independence in recovery; Sense of mastery, the general feeling of control over life circumstances, it buffers stress by reinforcing

perceived control; Self-esteem, overall self-worth, provides emotional stability and reduces vulnerability to stress; Identity continuity, maintains a stable sense of self despite external disruptions, supports psychological stability in crises; Self-control, the ability to regulate impulses, emotions, and behaviors, enhances coping by reducing reactive responses; Cognitive flexibility enables adaptive problem-solving and coping in changing disaster contexts; Cognitive appraisals, that is the intentional reframing of a situation to alter its emotional impact, differing from appraisal as it occurs after the initial evaluation, shape emotional responses by framing events in less threatening, more manageable ways; Emotional regulation, helps maintain emotional stability, preventing maladaptive reactions; Positive emotions, broadens coping resources, fosters optimism, and enhances psychological endurance; Optimism encourages positive future expectations, active coping, and stress buffering. Hope provides motivation energy to overcome crisis situations; Perseverance, sustains coping efforts over time, fostering long-term adaptability; Meaning and purpose, provides individuals with existential significance, aiding in recovery and post-adversity growth; Spirituality/faith offers emotional comfort, community support, a perspective for coping with suffering and uncertainty that emerge in disaster contexts; Physical health provides functional capacity and energy to engage in coping and recovery efforts; Mental health enhances emotional balance and cognitive capacity for adaptive coping; Healthy behaviors (sleep, diet, exercise) support physical recovery, emotional regulation, and overall stress tolerance.

Important factors in the domain of social-relational capacities, presented in Table 2, include: Empathy, which fosters mutual social support and strengthens emotional connectedness; Interpersonal skills, enhancing relationship building, connecting with supportive resources, and collaborative coping efforts; Help-seeking behaviors, provides access to external support systems which reduces isolation; Support from family, friends, significant others, and neighbors provide emotional comfort and reassurance, reducing isolation; Connections with informal community groups and ‘friendly strangers’ extend emotional and practical support beyond close personal networks; Mutual trust within social networks provides cooperation, information-sharing, and reliable support enhances the effectiveness of social ties, ensuring that individuals can depend on their networks for emotional and practical assistance.

The domain of social-ecological and structural resources, presented in Table 3, encompasses factors such as: Community participation, collective problem-solving, shared decision-making, and empowerment, which enhance resilience by providing a sense of ownership

and control in disaster response and recovery, strengthen community bonds, facilitate resource-sharing, and improve a community's capacity to adapt and recover from adversity; Access to healthcare, social services, and formal community organizations offers essential resources and professional support during crises, enabling individuals and communities to navigate challenges more effectively and sustain recovery efforts over time; Geographic location and previous exposure to environmental risks shape individuals' and communities' vulnerability, preparedness, and adaptive strategies; Familiarity with local hazards and lived experience of past events can enhance risk awareness and improve coping responses during future disasters; Economic capital (wealth, income), access to essential services, and social status provide material resources, reduce limitations in recovery efforts, and facilitate access to support systems; Education enhances resilience by increasing knowledge, preparedness, critical thinking, and adaptive capacity at both individual and community levels; Higher socioeconomic resources enable individuals to better prepare for, withstand, and recover from adverse events.

Chapter 3 - Models of Resilience

Understanding resilience in the aftermath of disasters requires more than a description of individual coping behaviors. It requires a structured approach to analyzing how personal, social, and environmental factors interact during adversity. Theoretical models of resilience provide such frameworks, offering structured perspectives that clarify the complex, multi-level processes through which resilience unfolds. These models enable resilience to be examined not as an abstract or fixed trait, but as an emergent phenomenon shaped by identifiable mechanisms across individual, relational, and systemic domains. In relation to older adults facing natural disasters, these models are particularly valuable. Older individuals occupy unique positions at the intersection of vulnerability and adaptive capacity, and their resilience is often influenced by factors extending beyond the individual level. By examining key theoretical models, a clearer understanding can be developed regarding how older adults navigate disaster recovery, which resources they mobilize, and how interactions across personal and environmental systems shape their adaptive responses. This theoretical grounding is essential for framing the coping strategies that will be analyzed in the following chapter.

3.1 Trajectory-Based Individual Differences Model of Resilience

Mancini and Bonanno (2009) present a theoretical model in Figure 1 that explores how individuals demonstrate resilience in the face of loss, particularly spousal loss. Their framework combines multiple individual difference variables through common psychological processes to explain why many people are able to cope with the loss of close relationships without significant disruption to their everyday lives. This model establishes a conceptual basis for analyzing the dynamic and complex nature of how people respond adaptively to major stressful events in life. In this framework, resilience is operationalized not as a stable dispositional trait, but as a particular developmental trajectory of psychological adjustment that emerges after experiencing a significant life stressor, like the loss of a loved one. Such an outcome is defined by the absence, or near absence, of noticeable impairments in everyday functioning. This represents an *ex post facto* definition, as it is identified and described only after the stressful event has already occurred. Importantly, the model differentiates resilience from two other common response trajectories to loss: chronic dysfunction, defined by acute, persistent, and disabling symptoms, and recovery,

which is marked by initial acute distress that gradually diminishes (usually within one to two years) allowing individuals to ultimately regain their pre-loss level of functioning despite experiencing moderate emotional difficulties during the adjustment period (Bonanno, 2004, as cited in Mancini & Bonanno, 2009).

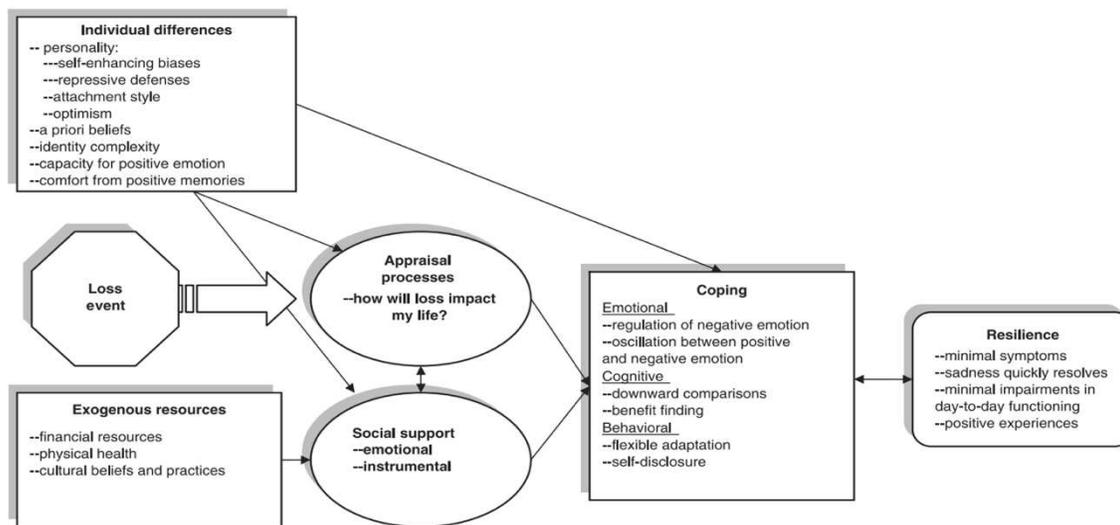


Figure 1: Trajectory-Based Individual Differences Model of Resilience (from Mancini & Bonanno, 2009)

Individual Differences and Coping Styles

Central to the model is the integration of multiple heterogeneous individual difference factors that together promote resilience as an outcome. Broadly speaking, these individual factors fall into two categories of coping styles: pragmatic coping and adaptable flexibility (Bonanno, 2004, 2005; Bonanno & Mancini, 2008; Mancini & Bonanno, 2006; all as cited in Mancini & Bonanno, 2009). Described as a single-minded, goal-driven approach, pragmatic coping involves doing “whatever it takes” and can emerge either from external situational demands or from rigid personality dispositions. This coping style includes repressive coping, dismissing attachment, and self-enhancing biases. Repressive coping refers to an automatic process in which individuals steer clear of negative or threatening information, showing elevated physiological responses but reporting little to no experienced distress (Bonanno & Singer, 1990; Bonanno et al., 1991; Hock & Krohne, 2004; Tomarken & Davidson, 1994; all as cited in Mancini & Bonanno, 2009). Unlike conscious suppression of thoughts or purposeful cognitive avoidance, repressive coping is distinct in that it functions without the individual’s deliberate effort to control or regulate aversive thoughts

and feelings (Bonanno et al., 1995, as cited in Mancini & Bonanno, 2009). As a form of attachment style marked by elevated avoidance and minimal anxiety, dismissing attachment manifests in individuals who downplay the importance of close relationships, prioritizing independence and self-reliance (Fraley et al., 1998, as cited in Mancini & Bonanno, 2009). Self-enhancing biases refer to a dispositional inclination to perceive oneself in an overly favorable and often unrealistic or illusory manner, which has been associated with psychological adjustment and effective coping in the face of adversity (Goorin & Bonanno, 2008; Taylor & Brown, 1988, 1994; all as cited in Mancini & Bonanno, 2009).

The second broad coping style, known as flexible adaptation or behavioral elasticity, is defined by an individual's capacity to modify and adjust their behavior in response to the specific demands of a stressful event. A range of individual differences may underlie the capacity for flexible adaptation. Research has shown that resilience following loss is correlated with more adaptive preexisting beliefs, the ability to experience positive emotions, and the tendency to derive comfort from recalling positive memories. Core elements of flexible adaptation include a priori beliefs (worldviews), positive emotions, identity continuity, and comfort from positive memories. Positive emotions refer to the capacity to experience and express uplifting emotional states, such as laughter, which has been shown to provide adaptive advantages during periods of stress. Identity continuity refers to the preservation of a stable sense of self, with minimal changes to one's view of self, which enables individuals to adapt flexibly to a world that has been altered by loss. Comfort from positive memories refers to the ability to elicit positive emotions and a sense of inner peace by recalling memories of the deceased (Bonanno, Colak, et al., 2007; Bonanno et al., 2001; Bonanno et al., 2002; Bonanno et al., 2004; Bonanno & Keltner, 1997; Fredrickson & Losada, 2005; Keltner & Bonanno, 1997; Lazarus & Folkman, 1984; Mancini & Bonanno, 2006; Tomaka & Blascovich, 1994; Tugade & Fredrickson, 2004; all as cited in Mancini & Bonanno, 2009).

Shared Mechanisms: Cognitive Appraisal and Social Support

Collectively, these coping styles reflect direct strategies to cope with loss. Importantly, the wide range of individual difference factors converge on two key shared mechanisms that indirectly affect coping: cognitive appraisal and the use and availability of social support. Appraisal processes refer to the cognitive evaluation and interpretation of a stressful event. By serving as a functional mechanism that mitigates the perception of loss as overwhelming or threatening, these

processes increase the likelihood that individuals will adopt problem-focused coping strategies instead of becoming overwhelmed by emotion-focused distress (Lazarus & Folkman, 1984; Olf et al., 2005; all as cited in Mancini & Bonanno, 2009). This mechanism is crucial for modulating emotional reactions and preserving psychological homeostasis. The use and availability of social resources underscore the vital role of interpersonal connections as a central mechanism supporting resilience. It highlights how multiple elements contribute to the social capital available to a person experiencing bereavement. For instance, Self-enhancement causes individuals to view their social support networks as more available and supportive (Bonanno et al., 2005, as cited in Mancini & Bonanno, 2009). Self-enhancers are more likely to have larger and more extensive social networks, and expression of positive emotions communicates a readiness for social engagement, which can in turn, strengthen and broaden available social resources (Goorin & Bonanno, 2008; Malatesta, 1990; all as cited in Mancini & Bonanno, 2009). Social resources confer substantial adaptive benefits in the context of loss by facilitating opportunities for meaningful self-disclosure, supporting emotional regulation, alleviating feelings of isolation, and encouraging the formation of new social connections. The model further posits a synergistic relationship in which the presence of supportive social resources fosters fewer threatening appraisals of the loss experience (Cohen & Wills, 1985; Lepore et al., 2000; all as cited in Mancini & Bonanno, 2009). Moreover, appraising loss in less threatening terms can elevate positive affect, which broadens thought and behavior and, in turn, facilitates the development of social resources, establishing a positive feedback loop (Fredrickson, 1998, as cited in Mancini & Bonanno, 2009). The absence of adequate social support is considered as a major risk factor for adverse psychological outcomes, such as the development of PTSD (Brewin et al., 2000; Ozer et al., 2003; all as cited in Mancini & Bonanno, 2009).

Theoretical Foundations

Lazarus and Folkman's (1984) appraisal theory serves as a foundational framework within the model, providing the theoretical basis for the "appraisal processes" mechanism (Park & Folkman, 1997, as cited in Mancini & Bonanno, 2009). The model highlights the role of individual differences in shaping whether a loss is appraised as a "challenge," perceived as manageable within one's coping capacity, or as a "threat," interpreted as surpassing one's ability to cope (Tomaka et al., 1993, as cited in Mancini & Bonanno, 2009). In this context, self-enhancing biases, repressive coping, favorable pre-existing beliefs, dismissing-avoidant attachment styles, and the capacity to

find comfort in positive memories are theorized to reduce the appraisal of loss as threatening, thus enabling more adaptive coping strategies. Conversely, more threatening appraisals of stressors are associated with more negative emotion, greater physiological reactivity and less adaptive neuroendocrine functioning (Epel et al., 1998; Tomaka et al., 1993; all as cited in Mancini & Bonanno, 2009). Consequently, these lead to an over-reliance on short-term emotion-focused coping strategies and a corresponding neglect of problem-focused coping (Olf et al., 2005, as cited in Mancini & Bonanno, 2009). Bowlby's (1980) attachment theory is fundamental to understanding individual differences, particularly in illustrating how early caregiving relationships shape adult attachment patterns and influence coping mechanisms in response to loss (Mancini & Bonanno, 2009). The model further refines attachment theory by differentiating between dismissing avoidance, which is considered adaptive, and fearful avoidance, viewed as maladaptive, within the context of bereavement. Fearful avoidance is considered maladaptive because it involves heightened anxiety regarding relationships, which is associated with prolonged and intensified grief symptoms. Fredrickson's (1998) Broaden-and-Build Theory of Positive Emotions proposes that positive emotions expand an individual's range of thoughts and actions, thereby facilitating the development of personal resources, including social resources. While not always explicitly referenced, the discussion regarding how positive emotions "quiet or undo negative emotions" and "increase the availability of social supports" directly corresponds with the fundamental principles of this theory (Cohen & Wills, 1985; Keltner & Bonanno, 1997; Tugade & Fredrickson, 2004; all as cited in Mancini & Bonanno, 2009). The model also draws upon terror management theory, particularly highlighting how "more benign beliefs about death would be of particular adaptive significance in the context of loss because such beliefs could ease the potentially deleterious effects of death anxiety" (Pyszczynski et al., 2004, as cited in Mancini & Bonanno, 2009), thus serving adaptive functions during bereavement.

Empirical Evidence and Model Attributes

This model is notable for several important attributes. Primarily, its empirical strength and grounded perspective challenge traditional views that bereavement necessarily results in severe and disabling distress, or that a lack of distress following loss indicates an abnormal or pathological response (Middleton et al., 1993, as cited in Mancini & Bonanno, 2009). Conversely, the model is underpinned by an expanding body of research showing that the majority of bereaved individuals

maintain stable and healthy psychological and physical functioning, suggesting that resilience represents the typical response to loss (Bonanno, 2004, as cited in Mancini & Bonanno, 2009). Empirical support for this comes from the Changing Lives of Older Couples (CLOC) study, where 46% of the bereaved sample exhibited resilience. Consistent findings have been reported in other studies, with resilience present in at least 50% of bereaved spouses, parents, and gay men (Bonanno et al., 2002; Bonanno et al., 2005; Mancini et al., 2006; all as cited in Mancini & Bonanno, 2009). The model presents a refined conceptualization of resilience, articulating a precise operational definition that frames resilience as a distinct psychological outcome trajectory, rather than an inherent personality trait. This definitional clarity enhances research precision, as the model rejects the notion of labeling individuals as possessing a “resilient personality.” Instead, resilience is viewed as an outcome, identified ex post facto, following exposure to significant stressors. Furthermore, by adopting this outcome-based definition, the model systematically differentiates resilience from other frequently observed grief trajectories, such as recovery, defined by the gradual alleviation of acute symptoms, and chronic dysfunction, involving acute, persistent, and disabling symptoms (Bonanno, 2004, as cited in Mancini & Bonanno, 2009). The model’s emphasis on the heterogeneity of resilience represents a notable advantage, as it acknowledges that “resilience is a variegated phenomenon that defies simple characterization.” The perspective underscores that resilience is attainable through diverse mechanisms instead of a single prescriptive path to adjustment. According to the model, the emergence of resilience depends on the interplay of numerous risk and protective factors across individuals, rather than any one primary determinant (Mancini & Bonanno, 2009). An innovative aspect of the model is its integration of “mixed blessing” characteristics, which traditionally are viewed as maladaptive due to associations with narcissism and health risks, but here, traits like repressive coping, dismissive attachment, and self-enhancing biases are shown to provide adaptive advantages specifically during loss (Bowlby, 1980; Bonanno et al., 1995; Bonanno & Field, 2001; Bonanno et al., 2002; Bonanno et al., 2005; Fraley & Bonanno, 2004; Coifman et al., 2007; Mancini & Bonanno, 2009; Mancini et al., 2009; Osterweis et al., 1984; Taylor & Armor, 1996; all as cited in Mancini & Bonanno, 2009). This perspective highlights the multifaceted character of coping mechanisms, proposing that what is adaptive in one context may prove maladaptive in another. This perspective shifts away from a singular, idealized model of adaptation, emphasizing that various coping strategies can lead to successful adjustment, making a “one-size-fits-all” approach to grief

inadequate (Mancini & Bonanno, 2009). The model's approach to identifying convergent mechanisms suggests that varied individual differences operate through shared pathways (specifically appraisal processes and social resources) and provides an integrated framework for understanding how these elements collectively facilitate resilience. This contributes to a more cohesive understanding of adaptive functioning.

While the empirical focus centers on interpersonal loss and bereavement, the model's conceptual framework is applicable to a broader spectrum of "highly stressful" and "potentially traumatic" events. Mancini and Bonanno (2009) explore whether resilience mechanisms specific to loss are distinct from those relevant to more intense and violent stressors, including combat exposure and physical or sexual assault. Importantly, individual difference variables such as self-enhancing biases, repressive coping, and positive emotionality, linked to resilience following loss, have also been implicated in buffering the effects of more severe traumatic experiences. Although examples remain limited, the model's foundational factors have been applied to contexts resembling large-scale traumatic events, including the 9/11 attacks and the civil war in Bosnia. In such disaster scenarios, the model's core mechanisms, particularly appraisal processes, play a crucial role, as the initial evaluation of the stressor as either "challenging" or "threatening" significantly influences coping strategies and physiological reactions (Lazarus & Folkman, 1984; Park & Folkman, 1997; Tomaka, Blascovich, Kelsey, & Leitten, 1993; all as cited in Mancini & Bonanno, 2009). The model's focus on active, problem-focused coping as opposed to passive, emotion-focused strategies is especially relevant when addressing complex stressors such as natural disasters (Olf et al., 2005, as cited in Mancini & Bonanno, 2009). However, it is important to acknowledge that, although principles from research on interpersonal loss and other traumatic experiences may be extrapolated to disaster contexts, the model does not include specific case studies or intervention examples directly related to natural disasters.

Given this conceptual flexibility, it becomes possible to draw meaningful parallels between spousal loss and the disruption caused by natural disasters, particularly in older adult populations. While spousal loss and natural disasters may seem like distinct forms of adversity, both share a common psychological thread: they disrupt an individual's sense of stability and continuity. For older adults, the coping strategies developed through personal bereavement (such as managing emotions, seeking social support, and maintaining a coherent sense of identity) become invaluable tools when faced with the sudden upheaval caused by a disaster. The emotional landscapes of both

experiences involve processing loss, uncertainty, and the need to rebuild meaning in altered circumstances. This parallel suggests that the adaptive responses honed through personal loss may enhance an older adult's resilience in disaster contexts, where similar mechanisms of adjustment are called upon, albeit on a broader, community-wide scale.

The development and validation of this resilience model predominantly depend on longitudinal and prospective research methodologies, which are regarded as the "only methodological solution" for accurately distinguishing grief trajectories and separating resilience factors from general stress responses. In the case of the CLOC study, baseline pre-loss data were collected from older couples, followed by subsequent interviews conducted at 6- and 18-months post-bereavement. To operationalize and validate the identified bereavement trajectories, the study utilized sophisticated statistical techniques such as hierarchical cluster analysis, nonlinear mixed model analysis, and latent class analysis. Key constructs assessed included worldviews (e.g., belief in a just world, acceptance of death) measured before loss, grief symptoms such as yearning, and clinical depression indicators. Additional resilience-related variables, including identity continuity (evaluated through self-reported identity changes in a collaborative task), positive emotional expressions (e.g., genuine laughter and smiles), and comfort derived from positive memories, were also incorporated (Mancini & Bonanno, 2009). However, specific psychometric instruments employed in these measures were not explicitly detailed.

Central to the model is its application to older adult populations, particularly through its use of the Changing Lives of Older Couples (CLOC) study. Described as a representative sample of older married couples, the CLOC study provides strong empirical support for the occurrence of resilience after spousal loss in late life. Results showed that 46% of bereaved individuals in the sample exhibited resilient trajectories, characterized by stable, low depression scores spanning three years before and 18 months following the death of a spouse, with limited grief symptoms reported. This evidence directly contradicts earlier beliefs that bereavement typically results in incapacitating distress, particularly in older populations. The model portrays older adults as active agents in their coping, capable of maintaining stable psychological and physical health despite profound loss. Data from the CLOC study illustrate that a significant portion of older bereaved individuals were able to "go on with their lives with minimal or no apparent disruptions in functioning." Even when they experienced normative grief responses such as intense yearning or intrusive recollections, resilient older adults effectively managed these symptoms without

functional decline. They are depicted as employing various adaptive strategies, including drawing comfort from positive memories of the deceased (Bonanno et al., 2002; Mancini et al., 2006; all as cited in Mancini & Bonanno, 2009). By focusing specifically on spousal bereavement in late life, the discussion frames resilience within an aging-specific context that accounts for age-related stressors. Findings from the CLOC study, which incorporated pre-loss assessments of worldviews among older couples, underscore the role of favorable a priori beliefs, such as strong beliefs in a just world and acceptance of death, in fostering resilience by reducing the perceived threat of loss. Additionally, the model's recognition that certain factors traditionally viewed as maladaptive (e.g., repressive coping and dismissive attachment) may have adaptive value in the context of bereavement reflects a sophisticated perspective that enhances the understanding of diverse coping strategies among older adults. Regarding limitations, the model, as primarily an individual differences framework, tends to underrepresent broader systemic and environmental influences that particularly affect older adults in natural disaster scenarios. Such factors include challenges related to physical mobility, restricted access to technology, pre-existing health issues, and the availability of community support systems. Although the model acknowledges "contextual and situational factors," its main emphasis remains on person-centered variables. Moreover, while the model's focus on bereavement is highly relevant to aging, it may insufficiently address the complex, multifaceted impacts of disasters, such as displacement, housing loss, and extensive community disruption, which hold distinctive consequences for older populations.

3.2 Disaster Resilience of Place Model

Cutter's DROP Model, presented in Figure 2, serves as a place-based model designed to enhance understanding of community resilience in the context of natural disasters. It was developed to improve comparative evaluations of disaster resilience at the local or community level, addressing the difficulty of establishing consistent standards and metrics for resilience measurement. The model is recognized as an integrative conceptual framework that brings together insights from various research areas, including global change, hazard analysis, political ecology, ecosystem science, and planning studies. It suggests that resilience functions both as an antecedent state and as a dynamic mechanism that develops over time. The conceptual foundation of the DROP model lies in the recognition that disasters affect individuals within defined geographic contexts, highlighting the importance of place-based characteristics alongside population attributes

in shaping disaster resilience. Communities, as defined by the model, consist of the complete set of social interactions taking place within a particular geographic space, including neighborhoods, cities, counties, or census tracts. Unlike perspectives that treat vulnerability and resilience as mutually exclusive, the DROP model suggests they may coexist, with certain characteristics contributing to both (Cutter et al., 2008). At its core, the model asserts that disasters primarily affect communities located within particular geographic boundaries (Boon et al., 2012; Zhou et al., 2010; all as cited in Tiernan et al., 2019; Cutter et al., 2008), highlighting the fact that that place-specific features are just as vital as population characteristics in influencing a community’s disaster resilience.

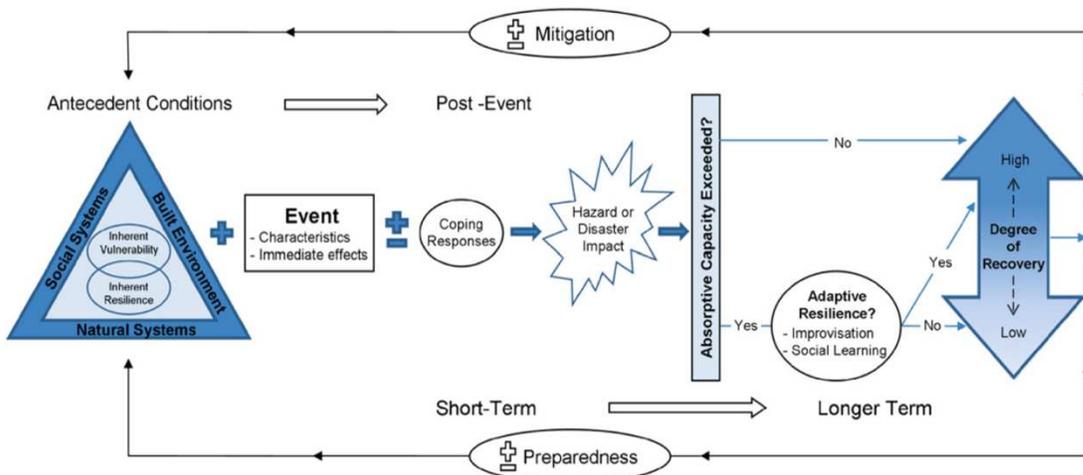


Figure 2: Disaster Resilience of Place (DROP) Model (from Cutter et al., 2008)

3.2.1 Dynamic Systems and Key Model Components

It represents a cyclical system that is dynamic, where each component is interconnected via complex cause-and-effect relationships and essential feedback loops. Antecedent Conditions mark the starting point in the model, illustrating the pre-existing circumstances of a community prior to exposure to disaster. These conditions arise from place-specific, multilevel processes operating within and across three interrelated systems: social, natural, and built environments. Antecedent conditions comprise both inherent vulnerabilities, defined as pre-disaster traits that increase susceptibility to harm, and inherent resilience, which refers to by the capacity for impact absorption and coping with disruptions.

Cutter et al. (2008) suggests that these concepts are not mutually exclusive but intersect, with antecedent conditions representing a static snapshot in time (static state), while the model's incorporation of post-event processes introduces a dynamic dimension. External influences, including federal policies and state-level regulations, significantly shape the resilience of communities under these conditions. Immediate effects arise from the interaction between antecedent conditions and the hazard event. The extent to which these effects are amplified or mitigated depends on the community's coping strategies and mitigation efforts, both of which are shaped by the antecedent conditions. Within the model, this dynamic is illustrated using plus and minus symbols to show amplification (plus sign) and attenuation (minus sign). Hazard events consist of the event's characteristics, referring to the specific attributes of the disruptive occurrence itself, such as frequency, duration, intensity, magnitude, and rate of onset. These factors vary according to the type of hazard and the geographic context of the study area.

According to Cutter et al. (2008), the occurrence of a hazard event impacts the system and triggers coping responses, with the characteristics of the event directly determining the intensity and type of coping needed. For example, sudden-onset disasters like earthquakes may overwhelm coping capacities, potentially surpassing the absorptive capacity of the community, whereas slower-onset hazards such as drought provide opportunities for more strategic coping and behavioral modifications. Additionally, coping responses are shaped by both the nature of the hazard event and the antecedent conditions present within the community. Thus, the coping phase functions as part of a larger, dynamic system, where the hazard event activates latent structural conditions and mobilizes institutional and social mechanisms designed to absorb impacts, respond effectively, and facilitate recovery.

Community coping strategies may include evacuation procedures, the creation of shelters, communication efforts, and coordinated emergency response plans. This interplay sets the trajectory for later outcomes, including adaptive resilience and the extent of recovery achieved. Absorptive capacity, also referred to as threshold, is the community's ability to withstand the impacts of a hazard through its established coping mechanisms. It serves as a critical threshold: when coping responses are adequate, the hazard's effects are mitigated, and the community remains within its absorptive capacity, resulting in a stronger recovery outcome. However, if the event's magnitude surpasses this capacity (either due to the scale of the hazard or inadequate coping responses), exceeding the threshold and heightening the risk of severe disruption or

disaster. The absorptive capacity or threshold of a community is vulnerable to being surpassed under two conditions: either the hazard event is exceptionally severe and exceeds local coping capacity, or the event is of moderate scale, but existing coping strategies are insufficient. When this occurs, the system moves closer to disaster. In response, adaptive resilience may emerge, where communities engage in improvisation (spontaneous recovery actions) and social learning (the institutionalization of effective adaptive practices) for future resilience-building. It involves "the diversity of adaptations, and the promotion of strong local social cohesion and mechanisms for collective action" (Adger et al., 2005, p. 1038, as cited in Cutter et al., 2008). Social learning is essential for counteracting the natural decline of individual and community memory over time. The occurrence of improvisation and social learning following a disaster event directly informs and modifies the community's inherent resilience in preparation for future hazards. Thus, experiential learning and adaptive behavior not only reflect but also transform a community's predisposition to risk. These post-disaster adaptive processes underscore resilience as a dynamic and continually evolving construct. Recovery level is viewed as the outcome of resilience, spanning a continuum from low to high. Swift and effective recovery is more likely when the absorptive threshold is maintained. If exceeded, the outcome depends on whether adaptive resilience is triggered, which potentially supports a more robust recovery. In its absence, recovery remains limited. Recovery is not static but evolves continuously until the next hazard event occurs. Thus, the overall impact of a hazard or disaster emerges from the combined influence of antecedent conditions, the nature of the hazard event, and the effectiveness of immediate coping responses. This impact is subsequently moderated by the community's absorptive capacity: when sufficient, it mitigates the effects and enables a rapid and strong recovery. The extent of recovery and the insights derived from adaptive resilience processes shape the condition of social, natural, and built environment systems, thereby informing the antecedent conditions that will influence the community's response to future events. For instance, the restoration of wetlands following a hurricane can strengthen natural defenses against future storms, thereby modifying antecedent conditions and enhancing inherent resilience. Learning facilitates the refinement of mitigation and preparedness strategies. This reflects a non-linear cycle in which stages of preparation, impact, response, and recovery feed into one another, shaping future readiness through either ongoing improvement or the reinforcement of pre-existing vulnerabilities (Cutter et al., 2008).

3.2.2 Recovery Across Different Timeframes

The DROP model was originally intended for natural hazard contexts, it can be extended to encompass other rapid-onset threats such as terrorism or technological failures, and slow-onset environmental hazards like drought (Cutter et al., 2008). Focusing explicitly on place-based social resilience, the model recognizes the intertwined nature of social processes, environmental systems, and infrastructural settings (Adger, 2000; Bruneau et al., 2003; all as cited in Tiernan et al., 2019). The model addresses disaster-related applications by evaluating how a community reacts to the immediate effects of an event through coping mechanisms. Such mechanisms encompass pre-established actions including evacuation procedures, shelter establishment, dissemination of information, and emergency response planning. The model incorporates both immediate coping mechanisms and extended recovery processes. Short-term recovery emphasizes a community's absorptive capacity, defined as its ability to mitigate the immediate impacts of a hazard through established coping strategies. Events with sudden onset, like earthquakes and hurricanes, demand immediate action and short-term coping approaches. Conversely, long-term recovery represents a continuous phase extending until the subsequent event, dealing with the deeper and sustained impacts of disasters, including extended disruptions to business operations (Cutter et al., 2008). The process involves rebuilding social infrastructure components like transportation, lifelines, health services, and education, a task that frequently extends over several years (Sakurai & Shaw, 2021). Providing a theoretical and measurable foundation for resilience assessment in disaster scenarios, the model aims to set baseline metrics that correspond with the evolving policy focus on proactive mitigation rather than reactive responses. Its focus on objective, comparative evaluation enables consistent resilience measurement across communities and longitudinal studies.

Applicability to Older Adults and Demographic Sensitivity

By integrating demographic factors as a core element of a community's social composition, the DROP model implicitly accounts for the specific experiences and vulnerabilities of older adults (Cutter et al., 2008; Parsons et al., 2016). Age is explicitly listed as a key variable in this dimension, reflecting its influence, along with gender, race, class, and occupation, on a community's preparedness and recovery capabilities in the face of natural hazards. The model recognizes that within a specific geographic boundary, sub-populations may display diverse levels of vulnerability and resilience, potentially causing disparities in the recovery process (Cutter et al., 2008). Within

the DROP model framework, older adults are identified as a demographic factor shaping the broader “social character” of a community, thereby impacting its inherent social resilience capacity. The literature points out that communities characterized by elevated rates of chronic disease and a larger elderly population are considered more vulnerable and likely to require increased post-disaster assistance and services (Tierney, 2012, as cited in Tiernan et al., 2019). This frames older adults as a contributing element to community vulnerability, leading to diminishing overall resilience capacity. The model mainly looks at the overall features of a place as a whole, rather than focusing on the individual roles people play or their personal actions during different stages of a disaster.

3.2.4 Operationalizing the Model through Indicators

The DROP model operationalizes community resilience through demographic and social factors, explicitly including age as a variable, thereby acknowledging the influence of older adults on a community’s preparedness and recovery capacities. Age is considered alongside other social variables such as gender, race, class, and occupation, reflecting how the community’s demographic composition can shape vulnerability and resilience in the face of disasters. Within the model, older adults are recognized as a demographic factor contributing to the broader social character of a community, influencing its overall resilience capacity. This highlights structural and community-level features (such as social composition, infrastructure, and institutional support) that determine the community’s ability to respond to and recover from disasters. While the DROP model emphasizes population- and place-level characteristics, it provides a framework for identifying communities with greater vulnerability and guiding resource. Building on its original conceptual framework, the model also considers social learning and feedback mechanisms, which can influence psychological resilience by improving preparedness and mitigation in the future (Cutter et al., 2008). Nevertheless, it treats older adults largely as a demographic category, without capturing the diversity of individual coping strategies or roles in disaster recovery. This limitation underscores the value of systemic approaches, such as the SyRes model, which incorporate adaptive capacities and feedback mechanisms, bridging structural and individual perspectives to better understand resilience and coping among older adults.

3.3 Systemic Model of Resilience

3.3.1 The Foundations, Evolution, and Application of the SyRes Model

The Systemic Resilience Model (SyRes), constructed by Lundberg and Johansson and presented in Figure 3, is a systemic model categorized under disaster response and resilience engineering. Its conceptual foundation stems from the analysis of the escalating interactability and complexity of contemporary socio-technical systems, advancing beyond traditional 'Safety I' approaches based on predictability and decomposability. SyRes, following the 'Safety II' approach, prioritizes adaptive capacity to cope with unforeseen disturbances. The model enables the simultaneous expression of resilience characteristics that might appear contradictory, such as robust resistance and adaptability (Lundberg & Johansson, 2015).

Within the context of disaster management, SyRes model provides a structured lens for the analysis of how systems respond to large-scale disruptions in disaster scenarios (Lundberg & Johansson, 2019). It has been applied in the re-analysis of real-life cases such as the "Run" Storm Exercise, the 2014 Västmanland forest fire, and the 2004 Indian Ocean Tsunami. The model accounts for both the immediate, short-term coping mechanisms (e.g., rapid response and improvisation), and long-term, extended recovery processes (e.g., adaptive reconstruction and continuous learning) (Lundberg & Johansson, 2015, 2019).

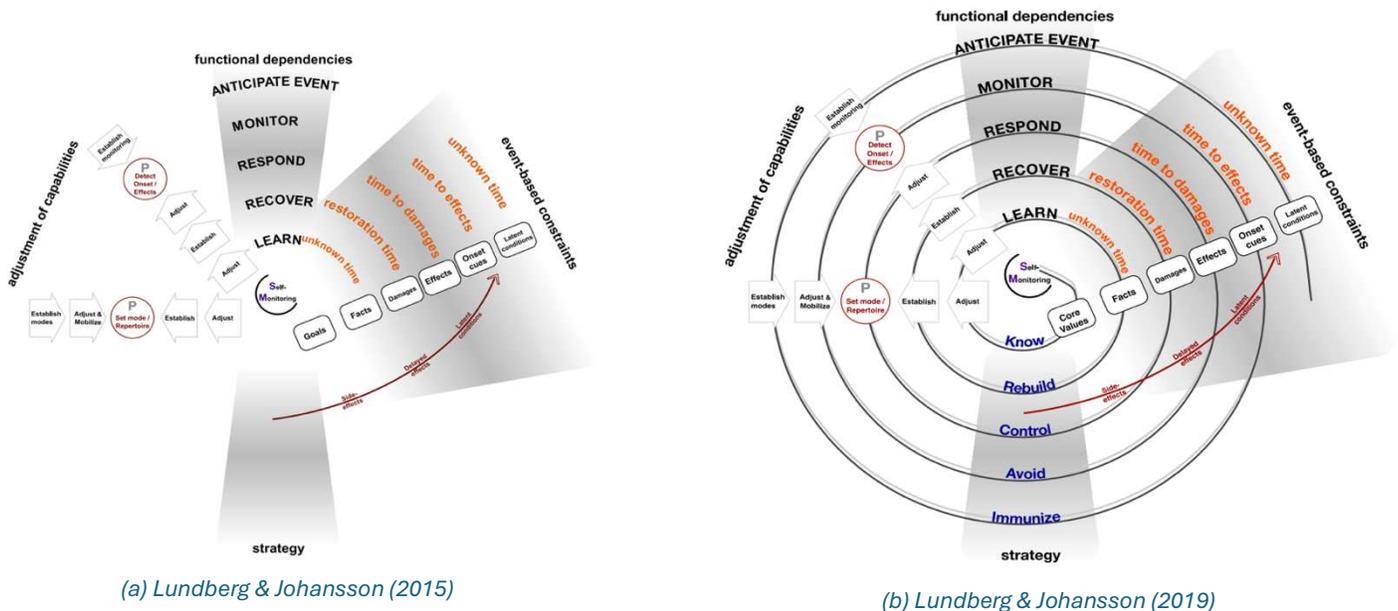


Figure 3. The original systemic resilience model (a) and revised systemic resilience model (b)

Limited Visibility of Older Adults

In terms of older adult inclusion, the model doesn't explicitly address older adults as active agents or systematically examine their role within the SyRes model. However, the case study of the "Rune" Storm Exercise implicitly reflects the vulnerability of older adults by documenting how elderly care services—both public and outsourced ones—become a priority amid limited power generator availability, necessitating crisis managers to weigh and negotiate competing core values (e.g., powering wastewater pumps versus heating elderly care homes). This illustrates that older adults' protection of well-being represents a critical system objective, shaping value-based decisions regarding the allocation of limited resources in times of crisis (Lundberg & Johansson, 2019).

3.3.4 Core Components of the SyRes Framework

The SyRes model is structured around four main areas: Event-based constraints, Functional Dependencies, Adaptive Capacity, and Strategy. It frames resilience as a circular process activating core functions (anticipation, monitoring, response, recovery, learning, and self-monitoring) (Lundberg & Johansson, 2015). The updated model shifts its focus from "goals" to prioritizing "core values" as the primary purpose a system protects, allowing their re-negotiation under pressure (Lundberg & Johansson, 2019).

Firstly, Event-based constraints serve as the initial adaptive context a resilient system must navigate. These constraints arise from unfolding, potential, or past events, creating limitations in time and as well as potential costs of threat responses. Events are characterized by latent conditions, onset cues, and direct and indirect damage effects. Such effects can cascade, producing side-effects or delayed responses, impacting adaptive behavior. For instance, a storm provides early cues like rising winds but can quickly cause damage (e.g., trees downing power lines), narrowing the time window for an effective response.

Secondly, Functional Dependencies encompass six essential functions systems use to manage and cope with events: anticipation, monitoring, response, recovery, learning, and self-monitoring. Organized cyclically, these functions enable early engagement with unfolding events. Anticipation allows forward-looking actions and setting up appropriate monitoring or response mechanisms. Monitoring plays a critical role in recognizing event onset, while Response consists

of taking timely measures as an event unfolds. Learning continuously updates the system for improved future anticipation, monitoring, and response. Self-Monitoring observes and adjusts all other resilience functions, ensuring the maintenance of its intrinsic adaptive capacity. This interdependent and cyclical arrangement underscores the functional dependencies necessary for adaptive.

Adaptive Capacity, the third core component, is central to SyRes, highlighting the system's ability to maintain control amidst unexpected disturbances. Effective management of such events requires diversifying responses, aligning with Ashby's law of requisite variety, which states that "only variety can destroy variety." This principle asserts that controlling complex situations demands a system's internal variety or complexity to match or exceed the variety of disturbances encountered. Here, "variety" encompasses: Sensemaking variety (interpreting ongoing events), Control variety (influencing situations), and Disturbance variety (complexity of unforeseen challenges). Recognizing that modern socio-technical systems often cannot anticipate all potential threats, the SyRes model frames resilience as a "double adaptive process." This involves not only responding to unexpected events but also shifting fundamental objectives, functions, resources, structure, and boundaries along a "core value ladder" when under pressure. This means the "object of resilience" may change, requiring a reconfiguration of how resilience is operationalized (e.g., shifting from firefighting to evacuation in the Västmanland fire). This perspective emphasizes that resilience includes proactive transformation of the system's essential elements, guided by movement along its core value ladder. The framework also acknowledges the constraints of finite resources, explaining how resource pooling and conflict dynamics affect a system's resilience, enabling a holistic comprehension of how systems maintain equilibrium.

Finally, Strategy reflects the practical implementation of resilience functions within real-world contexts (Lundberg & Johansson, 2015, 2019). The model proposes five basic strategies: immunization, avoidance, control, rebuilding, and knowledge. Immunization, for example, aims to shield the system from a threat (e.g., relocating a city threatened by mine subsidence), while avoidance strategies rely on timely monitoring (e.g., tsunami warning systems enabling evacuation). The control strategy manages the consequences of unavoidable situations (e.g., installation of flood barriers), and rebuilding aims to restore damaged parts, potentially with improvements. Knowledge, gained through learning, strengthens anticipation, monitoring, response, and supports adaptive improvisation (Lundberg & Johansson, 2015). The revised SyRes

model intrinsically links these strategies to the system's core values, which determine the focus of resilience ("resilience against what") and shape the formulation and implementation of anticipation, monitoring, and control strategies, highlighting that the object of resilience may shift under pressure (Lundberg & Johansson, 2019).

3.4 Multi-System Model of Resilience

The Multi-System Model of Resilience (MSMR), presented in Figure 4 and first proposed by Liu, Reed and Girard in 2017, has undergone significant refinement and development driven by ongoing empirical research and theoretical advancements. Furthermore, the subsequent developments outlined by Liu, Reed, Fung (2020), integrate crucial modifications founded on empirical findings drawn from the Multi-System Model of Resilience Inventory (MSMR-I). These revisions sharpen the conceptual clarity of the model, affirm its multidimensional structure, and enrich its practical and theoretical significance. The key changes to the MSMR include a re-conceptualization and re-labeling of its internal systems (two out of three of its core systems have been re-labeled), alongside empirical refinements that enhance the understanding of the system's components as well as their interrelationships. The refinements introduced in the 2020 revision include both terminological and conceptual shifts across the model's three systems. Firstly, "Core Resilience" was renamed as "Internal Resilience". This revision underscores the conceptual shift toward recognizing resilience sources as inherently "nested within the individual" (Liu et al., 2020). "Core Resilience" consisted of intra-individual factors like health behaviors (sleep, exercise, diet), stress response systems, physiological processes, and biological indicators as the most central and stable foundation of resilience (Liu et al., 2017). It also includes demographic profiles like age. "Internal Resilience", the revised label, reflects a more intuitive representation of foundational intrapersonal factors, encompassing physical and psychological health, self-perceptions of health, functional capacity, attitudes and mindsets which remain dynamic and influence future actions concerning health (Short & Mollborn, 2015, as cited in Liu et al., 2020). It also incorporates recent evidence in understanding genetic and neurobiological determinants of individual health in the context of resilience, which largely remain absent from most resilience conceptualizations (Basner et al., 2013; Cong et al., 2017; Osorio et al., 2017; all as cited in Liu et al., 2020). The original middle layer, termed as "Internal Resilience" was relabeled as "Coping & Pursuits". This revision was required to underline the system's "dynamic and changing nature" and

its integrative role in bridging the internal and external dimensions of resilience (Liu et al., 2020). Initially, “Internal Resilience” encompassed interpersonal personality-correlates, psychosocial constructs, and skills such as autonomy, self-control and regulation, hardiness, psychological toughness, coping style and appraisal, past experiences with adversity, resourcefulness, social competence, and grit (Blair et al., 2005; Chen et al., 2004; Duckworth & Quinn, 2009; Griffin et al., 2002; Gucciardi et al., 2009; Kobasa et al., 1985; MacKinnon & Derickson, 2012; Masten & Garmezy, 1985; Obradovic, 2012; Seery et al., 2010; all as cited in Liu et al., 2017). Conversely, "Coping & Pursuits" more accurately reflects the active process of "coping-related skills, knowledge, and goals that allow the individual to respond to challenges and needs". The outermost layer, referred to as "External Resilience", remains unchanged in terminology and continues to refer to socio-ecological determinants of resilience. This system comprises structural factors like healthcare access and social infrastructure at the community level, which frames the environment individuals depend on for resilience (Liu et al., 2020).

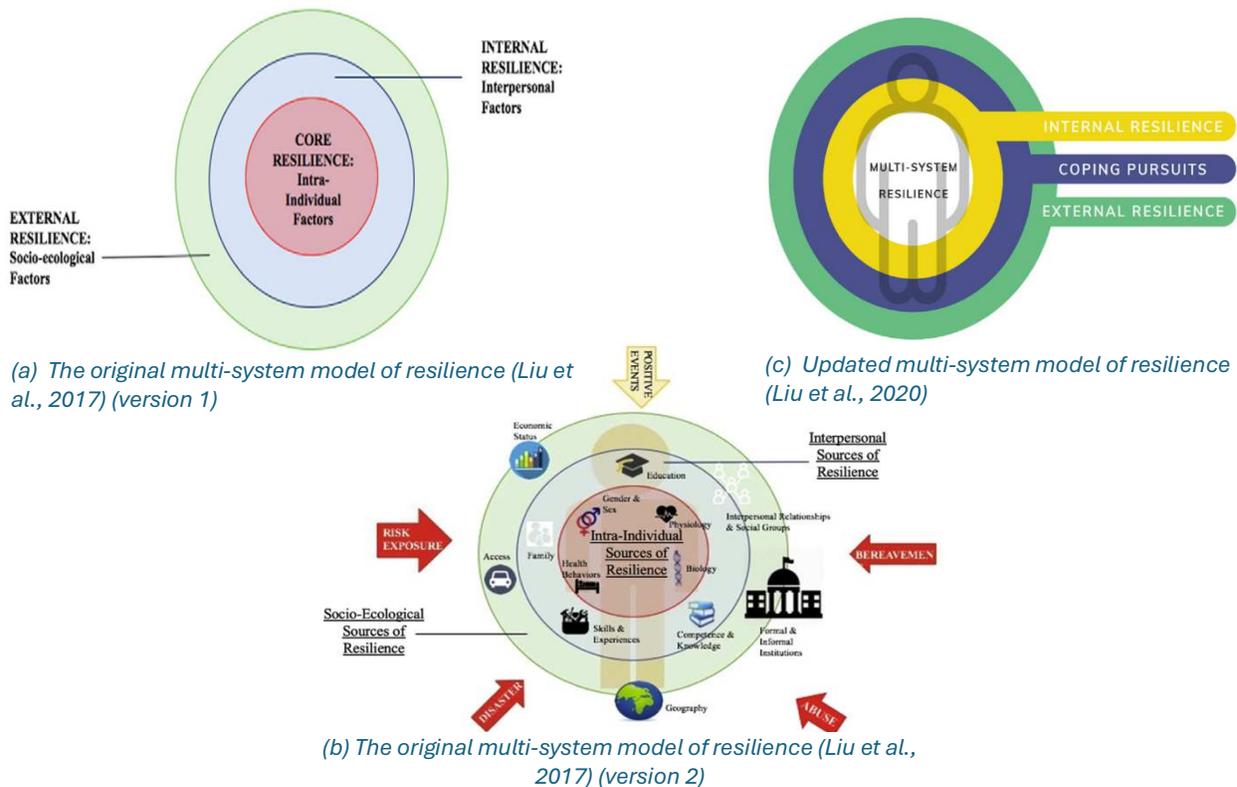


Figure 4: Visual representations of the multi-system model of resilience

The empirical validation for the model was established through the Multi-System Model of Resilience Inventory (MSMR-II), which is a 27-item self-report tool designed to assess the three systems of the model by means of multiple quantitative research techniques such as parallel analysis, exploratory factor analysis (provided "some support" for the structure of three systems), confirmatory factor analysis (provided additional support for the three-system structure, demonstrating a "moderately-good fit"), and Pearson's correlations that demonstrated convergent validity. One key empirical finding was that MSMR's External Resilience arose as a "unique factor", exhibiting less shared variance with established individual-focused resilience measures like CD-RISC and RS (Liu et al., 2020). This finding highlights MSMR's unique contribution in acknowledging the critical roles of socio-ecological and institutional factors such as healthcare access, workplace policies, community support, and social services in shaping individual resilience (Liu et al., 2017; Liu et al., 2020). While certain ecological models, such as those implicitly associated with community resilience efforts (Berkes & Ross, 2013; Norris et al., 2008; all as cited in Liu et al., 2017) acknowledge external factors, the MSMR distinctly incorporates these elements alongside internal and coping factors in a unified multi-system framework. This comprehensive approach addresses limitations of prior models that concentrated primarily on disaster response and community-level preparedness (Andrew, 2012; Magis, 2010; all as cited in Liu et al., 2020), thereby positioning the MSMR as a pivotal advancement in resilience research. The empirical findings also indicated that "Internal Resilience" and "Coping & Pursuits" (along with CD-RISC and RS) exhibited strong loading on a shared factor. This emphasizes the role of "Coping & Pursuits" in reflecting psychological and interpersonal dimensions that contribute to individual variability in coping strategies, styles, and cognitions (Liu et al., 2020). Therefore, although empirical findings suggest overlap, the MSMR's theoretical framework maintains a clear distinction that enables a more refined understanding: coping factors are not isolated but "cyclically inform" and are informed by individual health and broader socio-structural factors (Bonnano et al., 2015, as cited in Liu et al., 2020).

In conclusion, the theoretical models examined in this chapter provide valuable but incomplete perspectives on how individuals, particularly older adults, adapt to adversity. Each framework offers distinct insights into the processes and systems that support resilience, yet their full significance emerges when considered in relation to lived experience. This creates a logical transition to the final chapter, which synthesizes these models and applies them to the specific

context of older adults navigating natural disasters. By integrating key mechanisms across individual, relational, and structural levels, Chapter 4 moves from theoretical exposition to practical application, offering a more comprehensive understanding of resilience in later life.

Chapter 4- Bridging Theory and Practice: Resilience and Coping Strategies in Older Adults

This final chapter brings together the theoretical concepts of resilience with the coping strategies used by older adults during disasters. As highlighted earlier, older adults hold a distinctive and often contradictory role in disaster contexts, positioned between significant vulnerability and notable adaptive capabilities. Disasters are inherently traumatic, exposing individuals to life-threatening situations, financial loss, and displacement (Bakić, 2019). However, older adults are disproportionately impacted due to factors such as physical frailty associated with aging (Almazan et al., 2018; Almazan et al., 2019), reduced mobility, chronic health issues, limited resource access, challenges in self-protection, heightened risk of abuse and violence, limited proficiency with information technology, restricted political power and representation (Baker & Cormier, 2014; Burnett et al., 2007; Jenkins et al., 2007; all as cited in Liddell & Ferreira, 2019), and insufficient transportation availability (Cloyd & Dyer, 2010, as cited in Timalsina & Songwathana, 2020).

Although these vulnerabilities are well recognized, much of the existing research has focused predominantly on a deficit-based view of older adults in post-disaster contexts, emphasizing disabilities and diminished functional abilities rather than their strengths (Liddell & Ferreira, 2019). This focus has created a notable gap in the literature, where the active coping strategies and inherent strengths that enable many older adults to not just survive but also recover and thrive after traumatic events are often overlooked (Alcayna et al., 2016; Ballesteros & Domingo, 2015; Phelps et al., 2012; all as cited in Almazan et al., 2019). Importantly, there is a lack of research specifically examining the coping mechanisms of older disaster survivors, and many general resilience measurement tools do not adequately address factors especially relevant to older adults, such as finding meaning in life, spiritual resources, and different types of social support (Li & Ow, 2022).

Building on the foundation laid in Chapter 1, which emphasized the need to move beyond deficit-based models, and Chapter 2's discussion of resilience as a multi-layered construct encompassing individual, relational, and systemic levels, Chapter 3 introduced several key theoretical frameworks. These include the Trajectory-Based Individual Differences Model, the Disaster Resilience of Place (DROP) Model, the Systemic Resilience (SyRes) Model, and the Multi-System Model of Resilience (MSMR). This chapter seeks to integrate these theoretical

insights with observed coping behaviors among older adults, thereby bridging conceptual models with practical coping strategies. These strategies encompass, but are not limited to, drawing on prior disaster experiences (stress inoculation) (Tsuno et al., 2014, as cited in Almazan et al., 2019), engaging varied social support networks: bonding, bridging, and linking capital (Brockie & Miller, 2017), drawing upon cultural knowledge and spiritual beliefs (Timalsina & Songwathana, 2020), and sustaining psychological resources such as humor, self-esteem, optimism, hope (Fontes & Neri, 2015; MacLeod et al., 2016; McClain et al., 2018; all as cited in Li & Ow, 2022), along with self-efficacy (Blundo & Greene, 2007, as cited in Hrostowski & Rehner, 2012). By combining these theoretical perspectives with empirical observations, this chapter aims to deliver a holistic and applied understanding of resilience in older adulthood, guiding the development of disaster preparedness and recovery interventions that recognize and build upon the inherent strengths of older adults.

Taken together, these four models offer a comprehensive view on examining how older adults cope with disasters, moving well beyond a solely deficit-focused perspective to emphasize strengths and adaptive capacities across multiple levels. At the individual level, coping is shaped by each older adult's unique psychological traits and life experiences, as described by the Trajectory-Based Model. This individual coping is further influenced by their immediate physical and social environments, captured by the DROP Model. On a broader scale, their adaptive capacity is shaped by larger organizational structures and policy contexts, as outlined in the SyRes Model. Finally, the Multi-System Model of Resilience (MSMR) integrates these layers, conceptualizing resilience as a dynamic interaction between inherent personal characteristics, developed psychological resources, and external societal supports. This holistic view is essential for understanding the complex, adaptive strategies older adults employ during disasters, allowing for a nuanced appreciation of how individual strengths, social networks, and structural factors work together to foster resilience in later life.

4.1 Multi-Level Coping Resources Among Older Adults in Disaster Contexts

4.1.1 *Intra-Individual Coping Strategies and Psychological Resources*

At the intra-individual level, older adults utilize a range of personal characteristics, psychological traits, and cognitive processes to cope with disaster experiences. Importantly, their

prior behaviors and life experiences significantly contribute to enhancing resilience, leading to better psychological adjustment and reduced emotional distress following a disaster (Knight et al., 2000; Touhy et al., 2014; all as cited in Brockie & Miller, 2017). Table 4 presents a summary of empirical studies examining resilience and coping strategies among older adults in disaster contexts. It highlights the types of coping resources, including psychological, social, and structural, as well as study populations, disaster contexts, research designs, factors assessed, and key findings, providing a concise overview that informs the discussion of coping resources in this chapter.

Author(s) & Year	Population (N, age, location)	Disaster Type/Context	Type of study	Factors Assessed	Key Findings
Almazan et al., 2019	<ul style="list-style-type: none"> • 26 older adults (M=12, W=14) • Mean age= 64-68 years • Philippines 	<ul style="list-style-type: none"> • Typhoon Haiyan (2013) • Data collected 2 years post-disaster 	<ul style="list-style-type: none"> • Qualitative (FGDs and interviews) 	<ul style="list-style-type: none"> • Culture • Faith (spirituality) • Previous disaster experience • Social support 	Older adults' resilience and adaptation following a disaster profoundly influenced by understanding their culture, maintaining strong faith (spirituality), drawing upon crucial insights from previous disaster experiences, and receiving social support. These interconnected factors were found to facilitate the rebuilding of their lives.
Almazan et al., 2018	<ul style="list-style-type: none"> • 2,020 older adults (M=1,040, F=980) • Male mean age=68.23 • Female mean age=71.45 years • Philippines 	<ul style="list-style-type: none"> • Typhoon Haiyan (2013) • Data collected 1.9 years post-disaster 	<ul style="list-style-type: none"> • Quantitative (structured survey questionnaire) 	<ul style="list-style-type: none"> • Resilience (BRIC) • Life satisfaction (Life Satisfaction Scale) • Attitude (ATSDCS) • Spirituality (MI-RSWB-E) 	Spirituality ($\beta=0.292$, $p<0.01$) and positive attitude ($\beta=0.420$, $p<0.001$) were significant predictors of resilience. Older adults demonstrated high resilience (M=19.26, SD=2.78).
Brockie & Miller, 2017	<ul style="list-style-type: none"> • 10 older adults (M=4, F=6) • NR age • Ipswich, Australia 	<ul style="list-style-type: none"> • Brisbane Floods (2011 and 2013) • Data collected early to mid-2013 	<ul style="list-style-type: none"> • Qualitative (in-depth interviews) 	<ul style="list-style-type: none"> • Social capital • Previous life and disaster experience • Optimism 	Resilience supported by strong bonding capital (family/friends) for emotional and practical help, bridging capital (strangers) for recovery assistance, and prior disaster experience that fostered stress inoculation, positive appraisal, and guided coping and evacuation decisions.
Hrostowski & Rehner, 2012	<ul style="list-style-type: none"> • 10 older adults (M=4, F=6) • Mean age= 73.4 years • Mississippi Gulf Coast, USA 	<ul style="list-style-type: none"> • Hurricane Katrina (2005) • Data collected 5 years post-disaster 	<ul style="list-style-type: none"> • <u>Main study:</u> Qualitative (in- depth interviews) • <u>Participant selection:</u> Quantitative (depression & life satisfaction) 	<ul style="list-style-type: none"> • Coping skills • Personal strengths • Community support • New interest in life • Self-efficacy • Internal locus of control 	exhibited resilience through three primary themes: finding personal gratification by actively helping their community, realizing and affirming their strong sense of self-efficacy and ability to cope with challenges, and developing a reinvigorated interest in life and novel experiences despite their traumatic losses. They consistently maintained an internal locus of control, choosing to persevere as survivors rather than victims.

Liddell & Ferreira, 2019	<ul style="list-style-type: none"> • 5,713 older adults (M=2,076, F=3,637) • Mean age=73 years • Gulf Coast region, USA 	<ul style="list-style-type: none"> • Deepwater Horizon oil spill (2010) • Data collected 8 months post-disaster 	<ul style="list-style-type: none"> • Quantitative (CDC Gulf States Population Survey) 	<p><u>Outcome Variable:</u></p> <ul style="list-style-type: none"> • Individual resilience (Pearlin Mastery Scale) <p><u>Predictors:</u></p> <ul style="list-style-type: none"> • Demographic factors • physical & psychological health factors • Social factors: 	Demographic, health, and social factors all served as significant predictors. Age negatively associated with resilience; being female was protective. Health (e.g., mental health $\beta=0.596$, $p<0.001$) and social factors accounted for most variance in resilience.
--------------------------	--	---	--	---	---

Table 4: Empirical Studies on Resilience and Coping Strategies in Older Adults in Disaster Contexts

Prior exposure to natural disasters or other adversities contributes to building a psychological buffer that mitigates intense negative emotional reactions to future events by providing practical skills and insights. Older adults who have effectively managed previous traumas, such as war, economic depression, the loss of loved ones, or marital separation, often develop coping strategies that frame challenges as manageable obstacles. A central aspect of this process is cognitive appraisal, especially positive reappraisal and optimism. Resilient older adults typically interpret stressful situations in a constructive manner, perceiving them as more controllable and less overwhelming (Brockie & Miller, 2017). This involves reframing adversity as an opportunity for growth, rejecting a victim identity (some participants even expressed a belief in controlling their own destiny, reflecting a strong sense of mastery) and discovering renewed purpose or meaning in life, which supports the adoption of a more hopeful outlook. For example, older survivors of Hurricane Katrina reported gaining a new appreciation for life by focusing on existing positives rather than losses (Hrostowski & Rehner, 2012). Such positive attitudes are key predictors of resilience, enabling individuals to overcome adversity and reduce the risk of long-term psychological effects, including PTSD, anxiety, and depression (Tugade & Fredrickson, 2011; Jones, 2010; all as cited in Almazan et al., 2018). Optimism has been consistently linked to resilience across diverse populations and age groups, including older adults, such as cardiac patients with a mean age of 63.91 (Prince-Embury & Saklofske, 2012).

Self-efficacy and a sense of mastery are also key intra-individual contributors to resilience. Older adults who are resilient frequently demonstrate a strong belief in their own abilities and

maintain a perceived sense of control over their environment, which enables them to identify as survivors rather than victims. This internal locus of control encourages proactive behavior, leading them to seek out solutions and make deliberate choices rather than assigning responsibility to external forces such as fate or God (Almazan et al., 2018; Hrostowski & Rehner, 2012). Their cognitive skills, including intelligence, problem-solving, and cognitive flexibility, support their capacity to analyze stressors and address underlying causes, often by adopting a pragmatic “whatever it takes” mindset (Mancini & Bonanno, 2009; Hrostowski & Rehner, 2012). The ability to adjust both emotional and behavioral responses based on the demands of the situation is critical to preserving cognitive functioning and ensuring sound decision-making in high-stress contexts (Tugade & Fredrickson, 2004, p. 320, as cited in Prince-Embury & Saklofske, 2012). Resilient older adults often apply their accumulated “survival know-how” from past experiences, reframing potential threats as solvable problems and showing determination in the face of adversity. As one 83-year-old participant illustrated, she coped by “calling on former ways of doing things. I’m an assertive person. I can stay on top of the contractors rebuilding my house and harass them until the job is completed” (Brockie & Miller, 2017; Hrostowski & Rehner, 2012). This internal sense of confidence promotes a proactive and purposeful approach to managing difficulties, which in turn supports more favorable long-term outcomes and sustained psychological development. In this way, self-efficacy functions not just as a belief system but as an active, evolving resource that guides adaptive responses and strengthens resilience in the face of a wide range of stressors.

Emotional regulation also plays a critical role in resilience, as older adults must manage their emotional states to maintain day-to-day functioning (Li & Ow, 2022). This regulatory process encompasses the control of arousal, affect, attention, and behavioral responses (Prince-Embury & Saklofske, 2012). Some individuals utilize strategies such as “repressive coping,” which involves unconsciously filtering out distressing stimuli, while others rely on “cognitive reappraisal” to reinterpret stressful events in ways that emphasize personal growth, thereby reducing their emotional burden (Mancini & Bonanno, 2009). Although heightened emotional reactivity can increase vulnerability to psychological issues, the ability to adjust emotional responses with flexibility is a core component of individual resilience (Prince-Embury & Saklofske, 2012). This capacity becomes especially important for older adults, who often face persistent and uncontrollable stressors, including physical health decline or the loss of loved ones, which demand sustained adaptive coping (Karel, 1997, as cited in Lamond et al., 2008). Developing a flexible

emotional regulation strategy (aligned with the concept of ego-resiliency) allows for adaptive and context-appropriate responses, in contrast to rigid or erratic reactions that may hinder effective problem-solving and elevate emotional distress. Such emotional adaptability is essential for preserving cognitive capacities like decision-making and working memory, which are otherwise susceptible to disruption under high stress (Block, 2002; Block & Block, 1980; Block & Kremen, 1996; all as cited in Prince-Embury & Saklofske, 2012). As such, the ability to regulate emotions constructively serves as a protective factor, significantly supporting psychological well-being and reinforcing the broader adaptive capacities of older adults when facing adversity (Lamond et al., 2008).

A lifetime of accumulated experiences serves as a vital intra-individual asset for older adults. Prior exposure to disasters and life experiences equips them with essential skills and practical insights, functioning as a form of “stress inoculation” that mitigates the psychological impact of future traumatic events. They actively draw upon their “survival know-how,” applying strategies developed during past experiences such as war, economic crises, or personal losses to confront present-day stressors. This aligns with the idea that repeated exposure to adversity can strengthen resilience by fostering the development of “mature coping styles” and enhance adaptive capacity in later life. In doing so, it counters deficit-based views of aging by emphasizing the strengths that accumulate with age. Through years of navigating hardship, older adults build an extensive repertoire of problem-solving abilities, allowing for effective self-regulation even when faced with severely disrupted infrastructure and scarce resources. Continuous exposure to difficult circumstances refines their adaptability, contributing to more constructive appraisals of new stressors, which they perceive as manageable rather than overwhelming. As a result, this perspective offers a clear alternative to the dominant “narrative of decline” often associated with aging, instead highlighting the psychological growth and resilience that can emerge in later life. These insights underscore the importance of acknowledging and utilizing the extensive life and disaster-related experiences of older adults as essential assets in disaster (Almazan et al., 2018; Barton, 1969, as cited in Brockie & Miller, 2017; Hrostowski & Rehner, 2012).

Spirituality and religiosity represent significant intra-individual resources. Holding onto spiritual beliefs and participating in religious practices can offer psychological strength, foster a sense of meaning and divine connection, and enhance overall mental health. These functions collectively serve to reduce vulnerability to stress and trauma, aiding older adults in their ability

to adapt to adversity. Spirituality also plays a role in shaping hazard perception, supporting the development of social connections, and reinforcing a coherent sense of identity and life structure, all of which assist in effective coping and emotional regulation (Almazan et al., 2019; Cornell et al., 2012; Mohammadinia et al., 2018; Nobili et al., 2011; all as cited in Timalsina & Songwathana, 2020; Li & Ow, 2022). Research consistently identifies spirituality as a central protective factor that facilitates disaster resilience in older adults by providing a sense of direction and psychological security even in extreme circumstances. This is particularly important because spirituality aids in meaning-making, allowing individuals to integrate traumatic events into a broader existential framework and to cultivate a renewed appreciation for life, which supports emotional well-being. Although spirituality is widely regarded as a key predictor of resilience and an enabler of adaptive coping strategies, some scholars have raised concerns about excessive reliance on divine intervention (a concept referred to by Perrin, 2000, as hyper-religiosity). In certain cases, such overdependence might hinder proactive coping efforts or result in maladaptive interpretations, such as viewing suffering as a form of divine punishment. Therefore, integrating spiritual care into post-disaster support, while also promoting constructive attitudes, is crucial to strengthening older adults' adaptive capacities and fostering a resilient community culture in disaster contexts (Almazan et al., 2019; Hrostowski & Rehner, 2012; Pearson, 2005, as cited in Almazan et al., 2018; Timalsina & Songwathana, 2020).

4.1.2 Socio-Relational Resources

The socio-relational dimension underscores the essential function of *interpersonal relationships* in enhancing resilience among older adults. Networks composed of family members, friends, and neighbors serve as vital sources of support. These connections offer not only emotional comfort but also practical aid and reliable information throughout the disaster and recovery phases. For example, during flooding events, relatives and close acquaintances played a central role in collecting information, assisting with planning, and offering emotional, physical, and financial resources. The presence of strong social support systems significantly enhances an individual's ability to cope with trauma and psychological stress. In this context, social support encompasses a range of behaviors, such as contributing to communal efforts, fostering a renewed sense of community, exchanging mutual aid, and turning to trusted individuals for help. Findings from the literature indicate that older adults who had access to these support systems actively engaged in

adjusting to post-disaster realities and contributed to accelerating community recovery by helping others make informed choices during the rebuilding process. Furthermore, these interactions often strengthened older adults' sense of social responsibility and belonging, reinforcing their perceived ability to contribute meaningfully to their communities in the aftermath of disaster (Docena, 2015; Dai et al., 2016; all as cited in Almazan, 2019; Brockie & Miller, 2017; Hrostowski & Rehner, 2012; Timalsina & Songwathana, 2020)

Qualitative research involving older adults who experienced Hurricane Katrina reveals that shared adversity often fosters a renewed sense of community and mutual support. Through these collective experiences, older individuals frequently develop a deeper sense of belonging, increased commitment to their communities, and a recognition of their continued value. This redefined sense of community emerges as they realize their dual capacity to both receive and offer critical forms of support (emotional, physical, financial, and informational) not only to familiar contacts like friends and neighbors but also to previously unknown individuals. Engaging in tasks such as information gathering, planning, survival, and collective recovery reinforces their perception of personal agency and self-efficacy, often rooted in a lifetime of coping strategies and prior adversity. This renewed confidence underscores the importance of social capital in the recovery process. Defined as the ability to access resources through one's relationships and structural social position, social capital significantly shapes disaster adaptation outcomes for older adults. It facilitates access to material aid, essential services, and information.

While *bonding capital* (close, emotionally supportive relationships) plays a critical role in the immediate aftermath of a disaster, *bridging capital* (connections that span different social groups) and *linking capital* (ties to institutions and formal systems) are essential for sustained recovery by opening pathways to broader opportunities and resources. In recent flood contexts, for example, older adults frequently turned to "friendly strangers" for support, reflecting a growing reliance on bridging capital. In contrast, linking social capital was often found to be insufficient or lacking, pointing to a gap in institutional responsiveness. However, the breakdown of social networks (caused by factors such as blocked roads or communication failures) can isolate older adults, increasing the risk of psychological withdrawal, learned helplessness, and heightened vulnerability. Importantly, there is a reciprocal relationship between intra-individual and socio-relational coping mechanisms. A resilient mindset, characterized by optimism and self-efficacy, can prompt older adults to maintain or rebuild social connections. At the same time, strong social

support networks can buffer against emotional distress and reinforce internal coping capacities like self-efficacy, creating a reinforcing cycle of resilience (Brockie & Miller, 2017; Hrostowski & Rehner, 2012; Malatesta, 1990, as cited in Mancini & Bonanno, 2009).

4.1.3 Socio-Ecological and Structural Resources

At the socio-ecological and structural level, the coping capacity of older adults is largely influenced by the presence, accessibility, and effectiveness of *institutional support* and *policy measures*. This underscores the importance of creating comprehensive disaster management frameworks that are specifically designed to accommodate the unique needs of the aging population, rather than relying only on individual self-sufficiency. Recovery outcomes following disasters are notably improved in communities with strong *healthcare infrastructures*, where access to medical services is readily available. In such contexts, older adults are more likely to receive necessary hospital care and are less prone to engage in maladaptive coping strategies such as alcohol misuse and smoking. Additionally, individuals with higher *socio-economic status*, characterized by educational attainment, income, and employment, possess essential resources that facilitate problem-solving coping mechanisms, allowing them to prepare more effectively and reduce the negative impacts of disasters. However, these advantages are not equitably distributed. Those from lower socio-economic backgrounds, including racial and ethnic minority groups, frequently encounter greater financial challenges due to restricted access to affordable care within insurance networks and the risk of being underinsured. These disparities reflect structural inequities in the current disaster response systems. Moreover, a notable weakness in *linking social capital*, which refers to the connections between individuals and formal organizations or government entities, contributes to the underutilization of official disaster aid among older adults. This disconnect often results in skepticism toward authorities and hinders trust in public recovery efforts, pointing to a significant weakness in institutional support that is essential for sustained recovery. Addressing this gap is critical to strengthening older adults' long-term resilience and ensuring equitable access to assistance in the aftermath of disasters. (Aitsi-Selmi et al., 2016; Freedy et al., 1992; Hobfoll et al., 2011; Lehnert et al., 2020; Phibbs et al., 2018; all as cited in Shin & Ji, 2021; Brockie & Miller, 2017).

The interaction between the intra-individual, socio-relational, and socio-ecological structure levels is highly interdependent and dynamic. For example, an older adult's *prior disaster*

experience (intra-individual) may enable them to interpret a crisis through a more constructive perspective, which in turn motivates them to engage their *social support networks* (socio-relational) to obtain critical *institutional resources*, such as medical care or emergency housing (socio-ecological structure). However, this synergy can break down when *structural support* is insufficient. Weaknesses in *systemic infrastructure*, such as limited access to healthcare services or shortages of basic needs, can severely impair individual coping mechanisms and place additional strain on social relationships. In these cases, unresolved *physical and psychological health* issues may worsen, increasing the likelihood of maladaptive coping strategies, such as reliance on alcohol, particularly among those with lower socioeconomic status, who may be forced to prioritize conserving limited resources over addressing health-related needs. These structural limitations not only amplify psychosocial stress, but also highlight the cascading effects that institutional gaps can have across personal and social domains (Hawkins & Maurer, 2010, as cited in Brockie & Miller, 2017; Shin & Ji, 2021).

4.2 Critical Reflections and Future Directions on Older Adult Resilience

While resilience models offer valuable insight into how older adults cope with natural disasters, several critical limitations remain. First, many frameworks lack cultural specificity and fail to reflect how resilience is shaped by diverse social, geographic, and economic contexts. For instance, most models assume access to community resources or social capital that may not be equitably distributed across all older populations. Second, the increasing role of technology in disaster communication and recovery highlights a digital divide often overlooked in resilience research. Many older adults (especially those in lower socioeconomic groups) may lack the digital literacy or infrastructure necessary to access timely support or information. Thirdly, much of the literature continues to portray older adults as passive recipients of care rather than as active agents in their own recovery. This view underestimates their ability to draw on life experience, mobilize networks, and engage in meaning-making to adapt. Future resilience frameworks must do more to center older adults' perspectives and agency as part of the disaster recovery process (Almazan et al., 2019; Hrostowski & Rehner, 2012; Liddell & Ferreira, 2019; Li & Ow, 2022; Mancini & Bonanno, 2009; Timalisina & Songwathana, 2020).

This work examined resilience in older adults through an integrated, multi-level lens, revealing a far more complex and agentic picture than traditional deficit-based approaches suggest. By synthesizing theoretical models with observed coping strategies, it becomes evident that older adults are not merely passive recipients of care but active participants in their own adaptive processes. Their responses to disaster are shaped by a convergence of intra-individual, socio-relational, and socio-ecological and structural resources, all filtered through a lifetime of experience, making it a genuinely systemic approach.

The findings underscore the importance of contextualized, age-sensitive understandings of resilience that acknowledge both systemic inequities and individual capacities. Ultimately, advancing resilience research and policy requires a shift toward models that reflect the realities of aging populations, models that are inclusive, dynamic, and attuned to the strengths older adults bring to disaster preparedness, response, and recovery.

4.3 The Future of Assessment and Development of Resilience Measures for Older Adults: Psychometric and Disaster Implications

Future advancements in assessing resilience in older adults are critical, particularly within disaster contexts, given this demographic's unique vulnerabilities and strengths. While existing tools like the Resilience Scale (RS) (Wagnild, 2012) and the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003) are widely utilized, they are limited in holistically capturing resilience in later life. Despite demonstrating acceptable psychometric qualities in older populations (Cosco et al., 2016; Ho et al., 2012; all as cited in Li & Ow, 2022), current resilience scales often emphasize adjustment and enduring negative affect, contrasting with approaches focused on task-based coping (Patterson et al., 1990, as cited in Lamond et al., 2008). Recognizing that older adults frequently navigate uncontrollable or chronic stressors such as illness or bereavement, future resilience assessment must more accurately capture their expression of resilience, which is often grounded in strategies of acceptance and adaptation (Karel, 1997, as cited in Lamond et al., 2008). Developmental changes in later life, such as capacities associated with wisdom, will need to be considered in future resilience assessments for older adults (Baltes et al., 1991, as cited in Lamond et al., 2008). A key limitation of instruments like the CD-RISC, RS, and Brief Resilient Coping Scale (BRCS), is their focus on intrinsic dimensions often conceptualized for younger populations. This risks neglecting crucial extrinsic aspects for older adults, including

meaning and purpose in life, and diverse forms of social support, which future assessment strategies must address (Li & Ow, 2022). To address these limitations, Li and Ow's Resilience Scale for Older Adults (RSOA) represents a pivotal development. Specifically designed for older adults, this scale comprehensively incorporates personal strength, family support, social support, and meaning and purpose in life, demonstrating strong reliability and validity within this demographic (Li & Ow, 2022). Disaster-focused studies underscore the necessity for future resilience assessments to comprehensively integrate older adults' coping mechanisms, including family, community, and broader social support networks, alongside cultural beliefs, spirituality, and lessons learned from prior disaster experiences (Timalsina & Songwathana, 2020). Future research must also reconcile conflicting findings regarding the association between age and post-disaster resilience, where some studies suggest resilience increases with age through accumulated experience and social capital (Matsukawa et al., 2024), while others report a negative association (Liddell & Ferreira, 2019). Crucially, future resilience assessment tools must accurately account for gender-based differences, recognizing that older women often exhibit higher resilience through stronger social support networks, help-seeking behaviors, and leadership roles (Enarson & Morrow, 1998; Morrow & Phillips, 1999, all as cited in Liddell & Ferreira, 2019; Moreno & Shaw, 2018, as cited in Timalsina & Songwathana, 2020), while older men demonstrate strengths in independent evacuation decisions (Matsukawa et al., 2024). This necessitates the development of culturally sensitive, age-appropriate, and context-specific instruments. Such comprehensive measures will need to move beyond deficit models to capture the multi-systemic nature of resilience, integrating psychological, behavioral, social, and economic dimensions across all disaster phases (mitigation, preparedness, response, and recovery) (Liddell & Ferreira, 2019; Matsukawa et al., 2024).

References

- Adger WN. Social and ecological resilience: are they related? *Prog Hum Geog.* 2000;24(3):347-364 *
- Almazan, J. U., Cruz, J. P., Alamri, M. S., Albougami, A. S. B., Alotaibi, J. S. M., & Santos, A. M. (2019). Coping strategies of older adults survivors following a disaster: Disaster-related resilience to climate change adaptation. *Ageing International*, 44, 141-153.
- Almazan, J. U., Cruz, J. P., Alamri, M. S., Alotaibi, J. S. M., Albougami, A. S. B., Gravoso, R., ... & Bishwajit, G. (2018). Predicting patterns of disaster-related resiliency among older adult Typhoon Haiyan survivors. *Geriatric Nursing*, 39(6), 629-634.
- Antonovsky, A. (1979). *Health, stress and coping*. San Francisco: Jossey-Bass Publishers.*
- Bakić, H. (2019). Resilience and disaster research: Definitions, measurement, and future directions. *Psihologijske teme*, 28(3), 529-547.
- Block, J. H., & Block, J. (1982). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Development of cognition, affect, and social relations: The Minnesota symposia on child psychology* (pp. 39-101). New York: Psychology Press. *
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *The American Psychologist*, 59(1), 20–28. <https://doi.org/10.1037/0003-066X.59.1.20> *
- Bonfiglio, N. S., Renati, R., Hjemdal, O., & Friberg, O. (2016). The resilience scale for adults in Italy: A validation study comparing clinical substance abusers with a nonclinical sample. *Psychology of addictive behaviors: journal of the Society of Psychologists in Addictive Behaviors*, 30(4), 509–515.
- Brockie, L., & Miller, E. (2017). Understanding older adults' resilience during the Brisbane floods: social capital, life experience, and optimism. *Disaster medicine and public health preparedness*, 11(1), 72-79.
- Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues*, 54, 245–266. *
- Cowden, R. G., Meyer-Weitz, A., & Oppong Asante, K. (2016). Measuring resilience in competitive tennis players: psychometric properties of the resilience scale for adults. *South African Journal of Psychology*, 46(4), 553-565.
- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). *Depression and anxiety*, 18(2), 76–82. <https://doi.org/10.1002/da.10113>
- Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global environmental change*, 18(4), 598-606.
- Cvetković, V. M., & Šišović, V. (2024). Understanding the Sustainable Development of Community (Social) Disaster Resilience in Serbia: Demographic and Socio-Economic Impacts. *Sustainability*, 16(7), 2620.
- DeSimone, J. A., Harms, P. D., Vanhove, A. J., & Herian, M. N. (2017). Development and validation of the five-by-five resilience scale. *Assessment*, 24(6), 778-797.
- Feder, A., Fred-Torres, S., Southwick, S. M., & Charney, D. S. (2019). The biology of human resilience: Opportunities for enhancing resilience across the life span. *Biological psychiatry*, 86(6), 443-453.

- Ferraro F. Psychological resilience in older adults following the 1997 flood. *Clin Geropsychol.* 2003;26:139-144 *
- Friborg, O., Hjemdal, O., Rosenvinge, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: what are the central protective resources behind healthy adjustment?. *International journal of methods in psychiatric research*, 12(2), 65-76.
- Hrostowski, S., & Rehner, T. (2012). Five years later: Resiliency among older adult survivors of Hurricane Katrina. *Journal of gerontological social work*, 55(4), 337-351.
- Jowkar, B., Friborg, O., & Hjemdal, O. (2010). Cross-cultural validation of the Resilience Scale for Adults (RSA) in Iran. *Scandinavian Journal of Psychology*, 51(5), 418-425.
- Karairmak, Ö. (2007). Investigation of personal qualities contributing to psychological resilience among earthquake survivors: A model testing study (Doctoral dissertation, Middle East Technical University (Turkey)).
- Karairmak, Ö. (2010). Establishing the psychometric qualities of the Connor–Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Research*, 179(3), 350-356.
- Klohnen, E. C. (1996). Conceptual analysis and measurement of the construct of ego-resiliency. *Journal of Personality and Social Psychology*, 70(5), 1067.
- Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, 37(1), 1-11. doi:10.1037/0022-3514.37.1.1 *
- Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, D. J., ... & Jeste, D. V. (2008). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research*, 43(2), 148-154.
- Liddell, J., & Ferreira, R. J. (2019). Predictors of individual resilience characteristics among individuals ages 65 and older in post-disaster settings. *Disaster Medicine and Public Health Preparedness*, 13(2), 256-264.
- Li, Y. T., & Ow, Y. S. Y. (2022). Development of resilience scale for older adults. *Aging & Mental Health*, 26(1), 159-168.
- Liu, J. J., Reed, M., & Fung, K. P. (2020). Advancements to the Multi-System Model of Resilience: updates from empirical evidence. *Heliyon*, 6(9).
- Liu, J. J., Reed, M., & Girard, T. A. (2017). Advancing resilience: An integrative, multi-system model of resilience. *Personality and Individual Differences*, 111, 111-118.
- Lundberg, J., & Johansson, B. J. (2015). Systemic resilience model. *Reliability Engineering & System Safety*, 141, 22-32.
- Lundberg, J., & Johansson, B. J. (2019). Resilience is not a silver bullet–Harnessing resilience as core values and resource contexts in a double adaptive process. *Reliability Engineering & System Safety*, 188, 110-117.
- Luthar, S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562. *
- Mancini, A. D., & Bonanno, G. A. (2009). Predictors and parameters of resilience to loss: Toward an individual differences model. *Journal of Personality*, 77(6), 1805-1832.
- Manyena, B., Machingura, F., & O'keefe, P. (2019). Disaster Resilience Integrated Framework for Transformation (DRIFT): A new approach to theorising and operationalising resilience. *World Development*, 123, 104587.

- Masten, A. S., Best, K. M., & Garmezy, N. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology*, 2(04), 425. doi:10.1017/S0954579400005812 *
- Matsukawa, A., Nagamatsu, S., Ohtsuka, R., & Hayashi, H. (2024). Disaster Resilience Scale for individuals: A fundamental requirement for a disaster-resilient society. *International Journal of Disaster Risk Reduction*, 107, 104405.
- Norris, F.H., Stevens, S.P., PfeTerbaum, B., Wyche, K.F. & PfeTerbaum, R.L. (2008) Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150 *
- O’Connell, D., Walker, B., Abel, N., & Grigg, N. (2015). The resilience, adaptation and transformation assessment framework: from theory to application. CSIRO.
- Ostadtaghizadeh, A., Ardalan, A., Paton, D., Jabbari, H., & Khankeh, H. R. (2015). Community disaster resilience: A systematic review on assessment models and tools. *PLoS Currents*, 7, ecurrents-dis.
- Parsons, M., Glavac, S., Hastings, P., Marshall, G., McGregor, J., McNeill, J., ... & Stayner, R. (2016). Top-down assessment of disaster resilience: A conceptual framework using coping and adaptive capacities. *International Journal of Disaster Risk Reduction*, 19, 1-11.
- Prince-Embury, S., & Saklofske, D. H. (Eds.). (2012). Resilience in children, adolescents, and adults: Translating research into practice (Vol. 12). Springer Science & Business Media.
- Quinlan, A. E., Berbés-Blázquez, M., Haider, L. J., & Peterson, G. D. (2016). Measuring and assessing resilience: broadening understanding through multiple disciplinary perspectives. *Journal of Applied Ecology*, 53(3), 677-687.
- Sakurai, M., & Shaw, R. (Eds.). (2021). *Emerging Technologies for Disaster Resilience: Practical Cases and Theories*. Springer Nature.
- Shin, S. H., & Ji, H. (2021). Health risks of natural hazards and resilience resources: Evidence from a US nationwide longitudinal study. *Social Science & Medicine*, 281, 114110.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15, 194-200.
- Stainton, A., Chisholm, K., Kaiser, N., Rosen, M., Upthegrove, R., Ruhrmann, S., & Wood, S. (2018). Resilience as a multimodal dynamic process. *Early Intervention in Psychiatry*, 13(4), 725–732. <https://doi.org/10.1111/eip.12726>.
- Staudinger, U. M., Marsiske, M., & Baltes, P. B. (1993). Resilience and levels of reserve capacity in later adulthood: Perspectives from life-span theory. *Development and Psychopathology*, 5, 4, 541-566 *
- Teo, W. L., Lee, M., & Lim, W. S. (2017). The relational activation of resilience model: How leadership activates resilience in an organizational crisis. *Journal of Contingencies and Crisis Management*, 25(3), 136-147.
- Tiernan, A., Drennan, L., Nalau, J., Onyango, E., Morrissey, L., & Mackey, B. (2019). A review of themes in disaster resilience literature and international practice since 2012. *Policy Design and Practice*, 2(1), 53-74.
- Timalsina, R., & Songwathana, P. (2020). Factors enhancing resilience among older adults experiencing disaster: A systematic review. *Australasian Emergency Care*, 23(1), 11-22.
- Tusaie, K., & Dyer, J. (2004). Resilience: A historical review of the construct. *Holistic Nursing Practice*, 18, 3–8 *

- Ungar, M. (2011). The social ecology of resilience: addressing contextual and cultural ambiguity of a nascent construct. *American Journal of Orthopsychiatry*, 81(1), 1-17. *
- Van Kessel, G., MacDougall, C., & Gibbs, L. (2015). The process of rebuilding human resilience in the face of the experience of a natural disaster: A multisystem model. *International Journal of Emergency Mental Health*, 17(4), 678-687.
- Vella, S. L. C., & Pai, N. B. (2019). A theoretical review of psychological resilience: Defining resilience and resilience research over the decades. *Archives of Medicine and Health Sciences*, 7(2), 233-239.
- Walker, B., & Salt, D. (2012). Resilience practice: building capacity to absorb disturbance and maintain function. Island press. *
- Wagnild, G. (2012). Development and use of the Resilience Scale (RS) with middle-aged and older adults. In *Resilience in children, adolescents, and adults: Translating research into practice* (pp. 151-160). New York, NY: Springer New York.
- Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, 21(02), 152–169. <https://doi.org/10.1017/s0959259810000420> *
- World Health Organization. Older persons in emergencies: an active ageing perspective. Geneva, Switzerland: World Health Organization; 2008. *

* = References cited in other papers (not directly read)

APPENDIX –1

Multilevel Resources for Resiliency: Intra-individual, Social-Relational, and Structural Capacities and related references

Category	Subcategory	Key Elements/Examples
Intra-individual Capacities	Self-Perception & Identity	Self-efficacy, self-esteem, self-reliance, sense of mastery, identity continuity, self-control, self-awareness, trait self-enhancement
Intra-individual Capacities	Cognitive & Emotional Capacities	Cognitive flexibility, resourcefulness, perceived control, cognitive appraisals, emotional intelligence, emotion regulation, equanimity, humor, positive affect, emotional endurance
Intra-individual Capacities	Motivational & Existential Factors	Optimism, hope, determination and perseverance, sense of purpose, active coping, tenacity, challenge-seeking attitude, meaning-making, existential aloneness, spirituality/faith
Intra-individual Capacities	Health & Biological Factors	Physical health, mental health, healthy behaviors (sleep, diet, exercise), neurobiological/genetic factors
Intra-individual Capacities	Personality & Adaptive Traits	Adaptability, openness to new experience, sense of coherence, hardiness
Social-Relational Capacities	Social Competence (Individual Level)	Empathy, interpersonal skills, help-seeking behaviors
Social-Relational Capacities	Social Support & Networks	Bonding capital (family, friends, significant others, neighbours); Bridging capital (community organizations, 'friendly strangers', informal community organisations); emotional & practical assistance
Social-Relational Capacities	Trust	Mutual trust within networks
Social-Ecological & Structural Resources	Community Competence	Collective and flexible problem-solving, empowerment, partnerships, collective action & decision making, community social capital, communities' participation in recovery efforts, risk awareness
Social-Ecological & Structural Resources	Institutional & Structural Supports	Linking capital (connections to institutions/power structures): access to healthcare, social services, formal community organizations
Social-Ecological & Structural Resources	Environmental & Geographical Context	Geographical location, previous exposure to environmental risks
Social-Ecological & Structural Resources	Socioeconomic Resources	Economic capital (wealth, income), social status, access to essential services, education