Stress Across the Lifespan

Introduction

Picture a clown. He's wearing a baggy, silver, silk suit with orange pompoms running down the middle and a collar ruff. His face and bald head are painted white except for a wild crown of orange hair. In his gloved hand is a string leading up to a single red balloon. He smiles. His eyes, silvery grey before, now glow embers of pale yellow as his lips pull back to reveal knife-length, yellow fangs.

This is Pennywise, a shapeshifting clown from Stephen King's novel IT, who will serve as our metaphor for stress. I chose Pennywise to introduce this chapter for three reasons. First, he takes many forms. As we will discover, there are many types of stress that vary in what they look like and how they can affect us. Second, Pennywise is perceived differently with age. In the story, the children who first encounter his different forms return later as adults and face even more variations of the creature. Stress works similarly in that what it looks like and what it can do changes as we age. Third, for the characters in the novel, Pennywise represents a "challenge of knowing". Only after the characters learned more about Pennywise did they became better equipped to overcome him. We will consider stress in the same light – as representing a challenge for the fields of science and for ourselves. As disciplines like psychology and biology uncover more about what causes stress, how it impacts development, and what protective factors exist, we can begin to overcome its many forms.



One of Pennywise's favorite forms

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This leaves us with three main questions. First, what are the different forms of stress? Second, how do these forms differ across the lifespan? Third, what factors protect us against stress as we age?

Learning Objectives

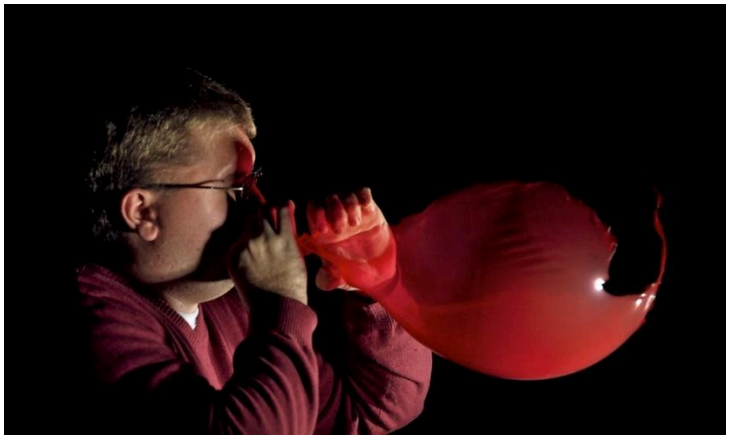
- Define stress
- Describe the impact of different forms of stress
- Understand how the types of stress and their impacts differ across the lifespan
- Recognize the role of context (culture, identity, ethnicity) in stress risk factors, the impact of stress, and development

What is stress?

Stress is the response of the body to any demand that heightens alertness, is aversive, and feels uncontrollable (Fink, 2016). Stressors then, are the specific demands that we feel are aversive and which challenge our ability to manage them with what resources we have. When we encounter negative emotions in response to a stressor, we are experiencing distress. This could mean feeling pain, anxiety, or sorrow.

What happens when we experience stress?

We can imagine the stress activation process like a balloon that stretches and compresses in response to a force. The balloon (our bodies) has an elastic limit (our coping capacity). When a force is applied to the balloon, it can stretch (we react to a stressor) before it returns to its original shape (we return to homeostasis). In some cases, stretching the balloon can actually increase its elasticity. That is, if we have the resources to successfully manage a stressor, we can increase our coping ability, and adjust to the new challenge. In other cases, the force can push the balloon beyond its elastic limit, and it pops. Thus, if a stressor pushes us beyond our ability to cope, we experience breakdown, and our health and well-being pay the price.



Each of us has a unique elastic limit determined by our genetics, early experiences, and social environments

"Highspeed Photography - Balloon Popping" by Jeremy Johnstone is licensed under CC BY-NC-ND 2.0.

What does this mean in biological terms? When we encounter an event and perceive it as distressing, there is a cascade of physiological changes that occur. First of all, the perception of the stressor activates the fear center of the brain – the amygdala. The amygdala then activates the sympathetic nervous system which releases stress hormones throughout the body – epinephrine and norepinephrine. The amygdala also activates certain parts of the hypothalamus which in turn releases more stress hormones - glucocorticoids - from the adrenal glands. At this point, the fight or flight system is engaged, increasing heart rate and blood pressure. The muscles are flooded with energy to move faster, blood-clotting is enhanced, and cognition and perception are sharpened. (Sapolsky, 2012, p. 126)

All of this is wonderfully adaptive - lifesaving if you're in real danger, like running from a tiger. It's also a response that spans across species, speaking to how incredibly ancient it is. However, "adaptive" in ancient terms doesn't necessarily translate to "adaptive" in modern terms. While this stress response is useful in small, proportional amounts, it also has the capacity to erode the things that make up the human experience – our sociability, intellect, and happiness.

The key takeaway is that stress is not inherently bad. Often times, it can push us to succeed, it can compel us to create or innovate, or it can facilitate our pursuit towards a lifelong goal. It is when we are pushed beyond our ability to cope, or when a stressful situation starts to feel out of our control that we experience breakdown. This is where Pennywise resides. This is negative stress and will comprise our discussion throughout this chapter.

But why should you want to read a whole chapter on something so gloom? The story of Rodney Fox offers some useful insight. In 1963, Rodney Fox was participating in a spearfishing competition off the coast of Australia when a behemoth Great White shark nearly crushed the life out of him. If it weren't for his wet suit holding in his organs and undergoing major surgery (requiring 462 stitches), Fox would have never returned to the water. But when he did, he did so with curiosity, to better understand the very thing that posed such a threat to his life. He would later innovate the first shark diving cage and eventually spur a world-wide interest in the animal. Now, Fox is one of the foremost authorities on Great Whites and a renowned shark conservationist. What's the lesson here? The better you understand something, the less fearful it becomes, and the easier it is to harness it. To begin to understand how stress changes across the lifespan, we will first learn about the different types of stress.

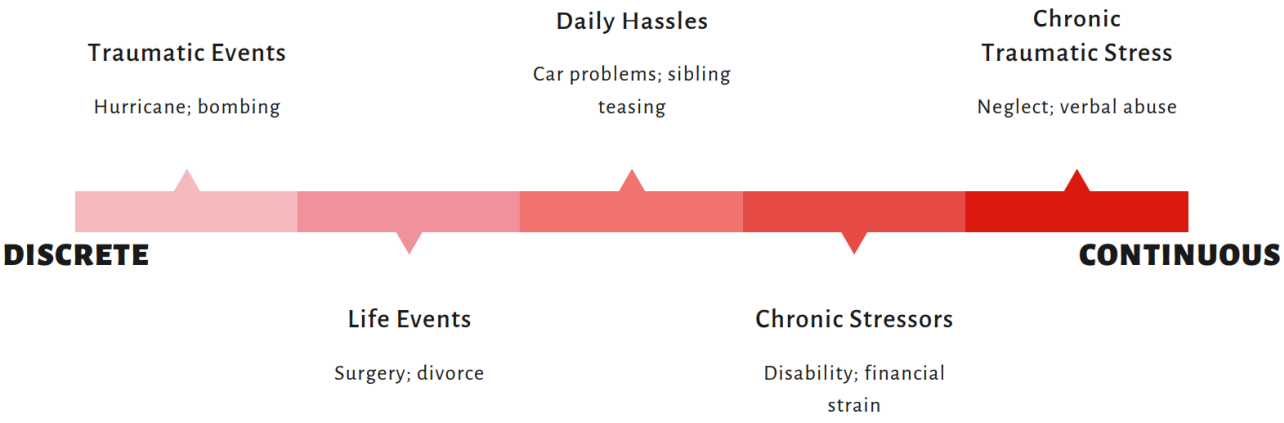


A photo of a Great White Shark (hopefully taken from within a diving cage)
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What are the different types of stress?

We can categorize the array of stressors along a continuum, from **discrete**, stressful events that have a definitive beginning and ending, to **continuous**, stress that is more ongoing (Wheaton & Montazer, 2008). A discrete stressor might be a **stressful life event** or experience that results in drastic change and requires coping (Compas, 1987). For instance, experiencing a divorce is a relatively singular event that produces change and requires adaptation. Opposite of discrete stress on the continuum is **continuous stress**. Continuous, or chronic stress, refers to enduring aspects

of the environment that create a continuous stream of threats and challenges for the individual (Compas, 1987; Serido, Almeida, & Wethington, 2004). For instance, having a physical disability can present consistent challenges such as completing routine tasks or being able to interact with friends or family. Continuous stress may also come in the form of smaller, agitating, events known as **daily stressors**, or hassles. These are day-to-day challenges related to work, home life, or unexpected small events that have short-lasting emotional effects (Serido, Almeida, & Wethington, 2004). For instance, maybe you have had a particularly argumentative coworker that got under your skin during the work week. In addition to stress occurring discretely or continuously, the severity of these forms can also vary. At its most severe, **traumatic stress** involves exposure to real or threatened harm towards oneself or others and has short- or long-term effects ranging from shock to physical symptoms (American Psychological Association, 2022). Traumatic stress can occur both discretely, as acute trauma, or continuously, as chronic trauma, with symptoms and outcomes usually being worse as exposure becomes more continuous (Bagneris et al., 2021).



The stress continuum with examples of stressors across the lifespan

An important factor when it comes to stress is the role of context. Contextual factors include one's culture, identity, or ethnicity. Context may also simply refer to the location from where stress emerges from. For instance, physical illness affects the individual, job loss impacts the family, and natural disasters affect whole regions of communities and the families therein. Throughout this chapter, we will learn that stress does not occur in a vacuum but is interdependent with other domains of life and is also chronological in its capacity to have both short- and long-term impacts.

Now that we've covered the different forms of stress – the shapes that Pennywise can take – we'll next discuss how they change across the lifespan while also considering the influence of contextual factors.

Early Life – Stress in Childhood and Adolescence

As we develop through childhood and adolescence, we begin to learn the consequences of our behavior. We construct predictability – whether its learning to trust our caregivers, our schools, or our own abilities. And here is where Pennywise can be so devious, by dismantling our certainty about the world. Can I trust my caregiver, or am I afraid? Will I be provided for, or will I be hurt? Do I have the ability to overcome a challenge, or is it easier to turn tail and run? At this stage, we are also manufacturing the material our balloons are made of, determining how elastic they will be, and thus shaping our ability to cope with stress throughout life. Early life thus lays the foundation for how stress is dealt with in middle and older adulthood.

Discrete Stressors

Stressful life events, distinct experiences that are negative, can have several consequences for children and adolescents. Such experiences are relatively rare compared to the other stressors we'll discuss, but can still include events like parent divorce, losing a family member, and illness or hospitalization (Sterling et al., 1985). These experiences can have short- and long-term consequences for health and well-being. For instance, children in divorced households may show conduct problems and have a higher likelihood of depression. They may also be more disobedient, whining, demanding, and unaffectionate (Emery, 1982). On the other hand, children who experience the death of a family member can have anxiety-related problems (Emery, 1982; Felner Stolberg, & Cowen, 1975). Furthermore, children who undergo hospitalization or surgery show increased behavior problems, such as restlessness or difficulty controlling anger (Melamed & Siegel, 1975).

Poverty is one of the most robust contextual factors in terms of its relationship to the different forms of stress. Children exposed to poverty not only have poorer cognitive outcomes and school performance, but they are also at risk for developmental problems (Lipina et al., 2005; Yoshikawa, Aber, & Beardslee, 2012). Furthermore, poverty is strongly associated with risk factors like unsupportive parenting, poor nutrition, and high levels of negative life events (Sohnkoff & Philipps, 2000). Important brain regions like the hippocampus and prefrontal cortex, as well as stress hormones, are all negatively impacted by poverty and negative life events. For example, children exposed to poverty have a smaller hippocampus, the brain region responsible for learning and memory, and this is worsened when negative life events are experienced (Luby et al., 2013). Youth from lower socioeconomic backgrounds also have higher stress hormones as well as smaller and less functional frontal cortices, the brain area responsible for decision-making and emotion regulation (Lupien et al., 2009).

The key takeaway here is three-fold. First, there are a combination of poverty factors (e.g., poor nutrition, unsupportive parenting) that contribute to disrupted development and well-being. Second, the combination of poverty factors also increases the likelihood of negative life events, like parental divorce (Hogendoorn, Leopold, & Bol, 2020) which further contributes to emotion and behavior problems in youth. Third, the combination of poverty factors and the role of negative life events has downstream effects for health and functioning in adulthood. For instance, early adversity increases vulnerability to drug and alcohol addiction in adulthood. This is because early stress and poverty factors cause an overproduction of stress hormones in adulthood

(which increases drug craving) and stunts the development of the frontal cortex, the area responsible for sound decision-making (Sapolsky, 2012, p. 196).

Continuous Stress

Continuous stress can come in two forms. Daily stressors, or hassles, are ankle biting, day-to-day problems. Chronic stress, on the other hand, is usually more threatening and uncontrollable. As opposed to negative life events which are typically more rare, continuous stress is more commonly experienced and often times more impactful. We will now learn about the specific examples of daily hassles and chronic stressors that are unique to early life.

Daily Hassles

For children and adolescents, daily hassles include things like being teased at school or by siblings, parental illness or fighting, academic or sport-related failures, or feeling physically inadequate (Kanner, 1987). Daily hassles contribute to internalizing behaviors like nervousness, irritability, or withdrawing, and externalizing behaviors such as bullying, fighting, or property destruction (Kliewer & Kung, 1998). They can also worsen pain associated with existing medical conditions such as rheumatic and sickle cell disease (Stone et al., 1997).

Daily hassles are distinct from negative life events in that the stress they produce can build up over time to produce emotional or behavioral problems (Bridley & Jordan, 2012). However, they are similar to life events in that it largely depends on contextual factors, such as a child's living conditions. In fact, like negative life events, daily hassles are more commonly experienced by poverty-stricken youth (Wadsworth et al., 2011). Recurring stressors like emotional and physical neglect, family conflict, and harsh, inconsistent discipline jeopardize emotional and cognitive development and increase the risk for anxiety and depressive disorders in adulthood (Anacker, O'Donnell, & Meaney, 2014). Thus, daily stressors in early life function like roadblocks to healthy brain development and these roadblocks are more likely to occur in impoverished households and threatening neighborhoods.

Chronic Stress

While there is a wide array of chronic stressors a person can experience, one that is especially relevant to early life is bullying. Bullying, or peer victimization, refers to repeated harassment with the intention to cause harm and can be physical, verbal, or through exclusion. It is estimated that between 5% and 20% of children are bullied. vanGeel and colleagues (2014) conducted a review of 34 studies on bullying and found that it increases the risk for suicidal ideation and attempts, with an even higher risk when it's experienced via social media or on the internet (i.e., cyberbullying).

Bullying is yet another example of how disadvantaged socioeconomic circumstances can create ongoing stress. For instance, bullies are more likely to come from families of single mothers, poorly educated parents, or those with poor employment prospects (Sapolsky, 2012, p. 198). On the other hand, youth with personal and family psychiatric problems are more likely to be the targets of bullying which worsens their already bleak adult outcomes (Sapolsky, 2012, p. 198).

Furthermore, bullies who are themselves bullied have the worst health trajectories into adulthood, with higher rates of depression, anxiety, and suicidality (Sapolsky, 2012, p. 198).

Factors that Reduce Stress in Early Life

Things have been fairly depressing so far, with so many forms and outcomes of stress, and we're not even past adolescence! But as Harvey Dent once said, "The night is darkest just before the dawn". In this section, we'll talk about the things that help us circumvent or overcome stress in early life. These are the relationships, environments, and strategies that make it harder for the artillery of stress effects to bombard well-being and development. Let's start with relationships, specifically, those between parents and children.

The fact that we, unlike other species, are born underdeveloped is not a bug, but a feature. We are innately wired to learn according to our surroundings, which in turn, determines the neurons that flourish, and those that shrivel away. This is one reason why our caregivers are so crucial. Given that infant exposure to stress can disrupt brain development (Lupien et al., 2009), relying on our parents to protect us preserves healthy growth. Moving from infancy to childhood and adolescence, parents whose support style remains warm, and nurturing is associated with less daily stressors for children (Holmes et al., 1987). Combine this style with an authoritative approach – having consistent and transparent rules while allowing for child input – and children are more likely to develop into happy and self-reliant adults (Sapolsky, 2012, p. 202). Furthermore, the way parents themselves deal with stress influences how stress affects their children (Antonucci et al., 2019), with better parent self-regulation being associated with less child and adolescent behavior problems (Neece, Green, & Baker, 2012). The parent-child relationship is a great example of how contextual factors can promote adjustment, or the ability to tolerate, manage or alleviate stress. Remember that bit about contextual factors being interdependent? Here's your smoking gun: having consistent and supportive parents can determine whether those less controllable contextual factors like poor living conditions can disrupt childhood development and recovery from stressful events (Pynoos, Steinberg, & Piacentini, 1999).

However, the parent-child relationship is not the only one that has a say in whether stress deals a debilitating blow. In fact, there are two additional sources of stress reduction for children and adolescents: school personnel and friends (Cauce & Srebnik, 1990). Support from school personnel, like teachers, can have several benefits for students including better emotional adjustment, academic achievement, and fewer psychological problems (Bru, Murberg, & Stephens, 2001; Natvig, Albreksten, Anderssen, & Qvarnstrom, 1999; Wentzel, 1998). Chu and colleagues (2010) reviewed 247 studies on the relationship between sources of social support and well-being, observing that this association was strongest when the support came from school personnel. In other words, social support that comes from the school setting appears to have great potential for protecting against stress. Similarly, social support from close friends and classmates buffers the negative effects of adversity on students' academic achievement (Malecki & Demaray, 2006). How does this work? It's theorized that social support cushions the blow from stressors by promoting positive emotions, self-esteem, and problem-solving (Chu et al., 2010). Furthermore, support from school personnel, classmates, and friends are beneficial in that they can provide caring behaviors or feedback and evaluation (Tardy, 1985).

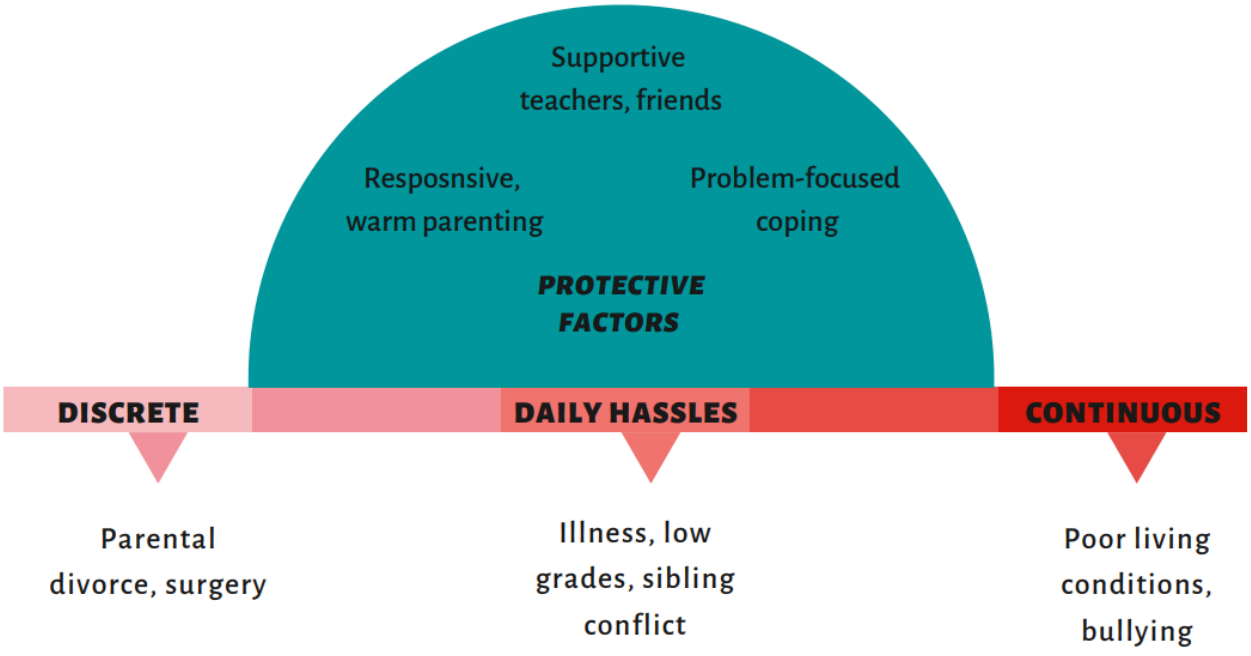
So, what does this tell us so far? Our environment matters. Anyone whose taken psychology 101 knows that. How does it matter? We are born, not as blank slates (sorry John Watson), but more like computer chips prewired to learn. A lot of the circuitry still needs programmed, however, and depending on how careful, attentive, and warm that input is, determines how well the circuitry operates throughout its life. The earliest input we receive – from parents and family - are crucial mediators in our first exposures to stress and how they impact our development. As we grow, the channels for receiving input broaden – our friends, teachers, and schools can now shape our reactions to stress and tendencies towards well-being. But where does this leave us in the equation? How can *we* be active participants in our trajectories towards well-being?

When we encounter a stressor - when Pennywise confronts us – we need to be prepared. We can do things beforehand to buffer our ability to confront distress when he shows his ugly mug. This leaves us with a bounty of self-help programs, DIY coping hacks, and pseudoscientific strategies (my personal favorite is Gwyneth Paltrow's Goop). How do we choose? The better question is, how do we solve the *problem* of stress? If we are talking about daily stressors like getting in a fight with a sibling, or on a more threatening level, being the victim of bullying, we can manage the resulting stress with primary or secondary control coping. Primary control coping refers to directly managing a stressful situation or one's reaction to it. This includes problem solving, emotional expression, and emotion regulation. Secondary control coping means adapting to a stressful situation such as actively accepting a situation, reappraisal, distraction, and positive thinking (Band & Weisz, 1990).

It may seem like common sense that the best way to deal with stress is to grab it by the horns or learn to take it in stride, but these aren't necessarily the default approaches. If primary- and secondary-coping had an insidious stepsister, it would be disengagement coping. This form of coping is more automatic and may come in the form of trying to escape the stressor, denying that it's stressful at all, emotional numbing, or inaction (Wadsworth et al., 2011). Although some evidence suggests that disengagement may be useful in the short-term (Wadsworth & Berger, 2006), relying on this as the *only* stress management tool can be quite harmful in the long-term (Santiago & Wadsworth, 2009). Therefore, being equipped to overcome the tendency to disengage is extremely important. In fact, Wadsworth, and colleagues (2011) have shown that it is not the stress itself that damages our health, it's the *lack* of action. This makes sense: if we don't deal with Pennywise as soon as he appears, he can return to his sewer grate, coiled and waiting to strike again. It might be unsurprising then that both primary- and secondary-control coping can reduce youths' psychological problems related to stress. These forms of coping also mitigate poverty-related stress and the self-isolation and aggressive behaviors that comes with it (Wadsworth et al., 2011).

Summary

Early life stress, whether in the form of parental divorce, dealing with bad grades, or bullying, can have consequences for general well-being as well as how children and adolescents develop. Insofar as well-being is concerned, these forms of stress are related to anxiety and emotion regulation issues as well as later life physical health problems like heart and liver disease (Almeida & Kessler, 1998; Felitti et al., 1998). Furthermore, exposure to these stressors, especially when worsened by poverty factors, can impair cognitive and emotional development. In turn, youth from disadvantaged communities can have lower academic achievement and higher rates of drug addiction.



The continuum with examples of early life stressors and protective factors

Although these stressors are sufficient for such bleak outcomes, this does not mean they are outright unavoidable. In fact, many, maybe even most recipients of early adversity go on to lead normal, adult lives. This is in large part due to social support from family, friends, and school workers which provide both tangible resources like caring and kindness and internal resources like a sense of belonging and personal identity. We can also be active in our dealings with stress by using primary and secondary coping, rather than relying on the sometimes-easier disengagement coping. We also learned that these active coping forms can in fact mitigate psychological problems and internalizing and externalizing related to poverty-induced stress.

Middle Life – Stress in Young- and Middle-Adulthood

With our balloon metaphor in mind, we now know that early life is unique in its power to shape elasticity, increasing or decreasing our coping capacity as we transition into adulthood. In his excellent book, *Behave,* Robert Sapolsky highlights the potential of early stress to impact later life outcomes. Like malnutrition impairing brain development, Sapolsky writes, a child raised in a neglectful environment may feel unlovable as an adult. Although the biological connection between malnutrition and brain development may seem more obvious than that between neglect and self-esteem, both operate by the same principles. "A cloud may be less tangible than a brick, but it's constructed with the same rules about how atoms interact." (p. 187) It is therefore important to keep in mind that stress is fundamentally a biological process, and it is through this process that stress encountered in early life influences adulthood. We discovered, for instance, how harsh or neglectful parenting styles lead to poor cognitive development, and later anxiety and depression. What we will discuss in this section is how such challenges can influence the experience of novel, adulthood stressors.

Keeping with the parenting style example, let's consider Richie, an eight-year-old that was dealt a pretty poor hand. His parents not only have their own set of psychiatric issues (i.e., depression), but deal with Richie's "problem behaviors" with a sooner-rather-than-later attitude. Because what works faster than brute force? Or just pretending the problem doesn't exist? Yet, at other times, they feel more up to the task, and so they might level with him, rationalize here and there. Furthermore, when they aren't quarreling, Richie's parents are generally inexpressive towards and dismissive of him. This concoction of abrasive, neglectful, and unpredictable parenting not only programs Richie's circuitry towards antisocial behavior and delinquency, but it can also weaken the circuitry's integrity. This is because early adversity, like Richie's dysfunctional environment, disrupts the neurotransmitters, hormones, and automatic responses related to stress (Anacker et al., 2014; Repetti et al., 2002). In turn, Richie is more reactive to stressors which may otherwise be pretty mild. In fact, several studies have found that, for children raised in cold, unsupportive families, there is a higher cardiovascular response to stress (Repetti et al., 2002), which in turn predicts interpersonal hostility. Thus, when Richie encounters daily hassles as an adult, like an argument with a coworker, his stress response might be wildly disproportionate to the conflict, resulting in things like shouting, rather than some harmless nostril flaring.

Discrete Stressors

As we approach adulthood, we take on new social roles like being a spouse, having an occupation, or being a parent. Sometimes, these roles have inherent demands which can overwhelm our ability to cope, stretching our balloons beyond their elastic limits. For instance, taking on the role of spouse can introduce the possibility of divorce. Discrete stressors can also come from other social roles, manifesting in the form of job loss, experiencing the death of a spouse, having an abortion or miscarriage, or ending a romantic relationship (Wheaton & Montazer, 2008). These stressful life events are associated with depressed mood, physical symptoms like headaches or insomnia (Billings & Moos, 1982), and an increased risk for suicidal ideation (Howarth et al., 2020).

Fortunately, akin to early life events, discrete stressors in adulthood are still quite rare, and their negative consequences tend to diminish after 6 to 18 months (Aldwin & Gilmer, 2004). But what about that increased susceptibility to stress that plagued Richie? Research has found that chronic adversity experienced in youth (e.g., low SES, high family conflict) is related to both more negative life events (Wichers et al., 2009) and more intense emotional reactions to them (McLaughlin et al., 2010). Moreover, the combination of early adversity and greater emotional reactivity may predict higher rates of mood and anxiety disorders in adulthood. So, what's going on here? Like we mentioned earlier, biology plays a large part. Stress response circuitry like the autonomic nervous system and the HPA-axis are both negatively impacted by early stress (van der Vegt et al., 2009), leading to problems in adulthood with managing emotions and social situations (McLaughlin et al., 2010).

Daily Hassles

Adulthood brings a new barrage of daily hassles including work-related ordeals, caring for others, and commuting between work and home (Almeida, 2005). They may also be relatively unexpected conflicts such as arguments with children, home repairs, or unexpected work deadlines (Almeida, 2005). To get a better idea of how these stressors impact adults, the National Study of Daily Experiences was conducted in 2002. 1,483 men and women journaled their experiences of daily stressors and reported them on a weekly basis. For both men and women, the most common stressors were interpersonal arguments and tensions, accounting for half of the reported stressors. Interestingly, while women were more likely to report social network-related stress (conflicts related to relatives or friends), men experienced more work-related stress (Almeida, 2005).

Similar to the effects of daily stress in children, daily stressors threaten adults' well-being by having both immediate impacts on health as well as accumulating over time towards more serious effects. For instance, in the short-term, interpersonal, work-related, and home-related stressors are associated with psychological and physical symptoms (Neupert et al., 2007) that tend to resolve within a few days (Serido et al., 2004). Psychological symptoms include feeling restless, nervous, or sad, while physical symptoms include headaches, chest pains, or poor appetite (Neupert et al., 2007). On the other hand, long term experiences of these types of daily stressors can result in anxiety and depression (Neupert et al., 2007; Lazarus, 1999).

If we consider the role of early life stress in adulthood daily hassles, a couple of things emerge. First, childhood and adolescent stress like bullying, neglect, and poverty are associated with emotional reactivity to daily stress in adulthood (Cristóbal-Narváez et al., 2016; Wichers et al., 2009). Second, having experienced more early stress makes it easier for daily hassles to get under the skin and can snowball over time leading to depression. Having a genetic disposition towards depression amplifies this effect (Wichers et al., 2009). Starting to seem like the same old depressing song? Well, it's not Hans Zimmer doing the composing. The primary mechanisms are, again, biological. Growing up in an unsafe or cold environment creates a dysregulated HPA-axis and nervous system on one hand and jeopardizes the development of those crucial stress control brain areas on the other. Not only is the stress *response* circuitry damaged from the get-go, but the stress *regulation* circuitry is compromised as well.

Chronic Stressors

Adulthood chronic stress can include the strains associated with major social roles such as those related to work or parenting. In fact, job stress is the most prevalent source of chronic stress (Fink, 2016) and arises from a constant, overwhelming workload or a lack of control over one's duties (Karasek, 1979). Other sources of chronic stress may be "ambient", or not bound to a specific social role, such as unemployment or financial hardship (Catalano & Dooley, 1983). Physically, chronic stress is associated with elevated blood pressure, heart problems, obesity, Type II diabetes, and immunity issues (McEwen, 1988). Psychologically, chronic stress is associated with impaired memory, reduced visuospatial skills, and a lack of focus on everyday tasks as well as a higher risk of depression (Marin et al., 2011).

Early life stressors like family instability, parental conflict, or poverty can influence adulthood chronic stress. For example, exposure to stress in childhood has been shown to exacerbate job strain or feeling a lack of control over work (Elovainio et al., 2007). Furthermore, a stressful childhood predicts worse job-related stress for work that is particularly risky or hazardous (Andrews et al., 2020).

Recall that the contextual factors of stress represent the cultures, identities, and locations of stress. For instance, stressors such as noise, crowding, and crime originate from the neighborhood, community, or broader region (Evans & Lepore 1997; Wheaton & Montazer, 2008; Serido et al., 2004). Both directly experiencing and constantly anticipating these challenges generate ongoing threats for the individual which undermines well-being (Serido et al., 2004). Thus, for individuals who live in impoverished environments, such as ethnic minorities, there is an increased risk of facing chronic stressors from contexts like one's neighborhood and community (Hayward et al., 2000; Murkey et al., 2022). For instance, marginal employment, low income, and segregated living conditions are more probable for black Americans (Farley 1984; Jargowsky 1994; Massey & Denton 1993).

Factors that Reduce Stress in Middle Life

There are a couple of things we pointed out in the early life section that are relevant to stress reduction factors here. One is the role of family and parenting. As we've seen so far, poverty brings with it more negative life events, daily hassles, and chronic stressors in both early and middle life. A mitigating factor, however, is the social support that was so crucial in early life. After having experienced early adversity, adulthood prospects are better if early family life was stable and loving, rather than broken and cold (Sapolsky, 2012, p. 200). Furthermore, support from friends, classmates, and teachers can buffer the impact of stress by boosting self-esteem and problem-solving, thus burning the stress bridge from early to middle life before Pennywise can cross it. Now, we'll discuss factors and strategies that are more unique to adulthood in reducing the impacts of stress.

Given that employment is both an inescapable part of adulthood and its most common source of chronic stress, it's virtually inevitable that we discuss how to protect ourselves from it. Work stress can be managed from either a primary or secondary approach level. Primary approaches are organization-wide frameworks that try to remove the source of stress itself (Murphy &

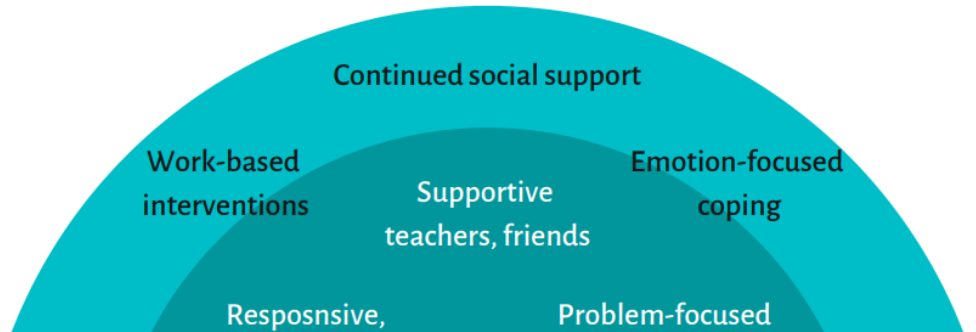
Sauter, 2003). Some examples include redesigning jobs, increasing employee decision-making authority, or providing worker support groups (Richardson & Rothstein, 2008). More commonly used are the secondary programs that equip individual workers with instruction and techniques to cope with stress (Giga et al., 2003).

Richardson and Rothstein (2008) reviewed 38 studies of secondary interventions, the most prevalent of which were cognitive-behavioral approaches, relaxation and meditation, and alternative approaches. Cognitive-behavioral interventions attempt to educate workers on how their thoughts and emotions influence stress management and how to update these thoughts to promote coping (Bond & Brunce, 2000). On the other hand, relaxation and meditation strategies attempt to reduce negative reactions to stress by creating a mental state that is resistant to it (Benson, 1975). Alternative approaches included journaling, seminars, and exercise programs. Overall, the use of secondary level interventions was largely effective in reducing workplace stress. Although meditation/relaxation was the cheapest and most common intervention, cognitive-behavioral strategies were the most effective. Richardson and Rothstein interpreted the difference in effectiveness as a matter of being in charge of the stress. While relaxation aimed to let go of, and move stress away from one's mind, cognitive-behavioral approaches sought to actively change the thoughts, emotions, and behaviors related to the stressor.

Building on our early life section about primary and secondary coping, a similar story emerges for adulthood stress management. This brings us to three domains of coping: problem-focused, emotion-focused, and avoidant coping. Problem-focused coping entails modifying or eliminating the source of stress by dealing with the reality of the situation. Emotion-focused coping is characterized by trying to control stressor-related emotions and maintain emotional stability (Billings & Moos, 1984). Overall, problem-solving, and emotion-focused styles of coping are associated with less severe stress outcomes, whereas avoidance styles of coping (e.g., bottling emotions or distracting) are linked to more serious outcomes like increased depression (Billings & Moos, 1984).

Summary

If you've made it this far, I applaud your resilience. If you skipped ahead, Godspeed! What did this section tell us? First, as we enter adulthood, Pennywise rears his head from our cementing social roles – parenthood, employment, marriage, although these certainly are not the only sources of stress. Second, the more ongoing the stress, the worse the outcomes, with chronic stress having especially debilitating potential, including immune and heart problems, obesity, and depression. Third, biological, developmental, and contextual factors continue to play decisive roles. Early disruptions to the stress response and regulation circuitry can make even small conflicts flammable. Furthermore, impoverished living conditions, like those that affect minority groups, are associated with more daily hassles and chronic stressors which erode health and coping capacity.



The continuum with added examples of middle life stressors and protective factors

At this point we know that stress is bad company, making the journey from early to middle life best traveled alone. However, Pennywise can hang around in the form of early life adversity like conflict-ridden family life and neglectful parenting. Although most of us find blissful solitude as we enter adulthood, Pennywise lingers longer and looms larger following more exposure to early stress. Ditto if there's multiple types – like neglect and poverty co-occurring. What's the surest way to travel safely? Less early stress, kind and caring parents, friends, and teachers, and good personal and occupational stress management resources. There's still one more stop however, and with it comes forms of stressors previously unseen.

Later Life – Stress in Older Adulthood

In his seminal article, "Stress and the Life Course: A Paradigmatic Alliance", Leonard Pearlin highlights a key misconception about later life: aging is stressful. Although the risk for health issues may increase, the author states, there is no evidence that stress is a direct consequence of becoming old. I chose this depiction of the aging process because it vindicates the stigma around getting old. Physical and cognitive decline need not be dead-end roads that we must all inevitably trudge towards. Instead, like other stressors, they are obstacles that we can choose to adapt to and overcome. And as we will discover, there are characteristics and strategies that help us do just that.

Discrete Stressors

Discrete stressors like divorce or job loss become less common when moving from middle to later life (Pearlin, 1996). Taking their place are events like the onset of illness or physical impairment, losing a loved one, and witnessing family hardship (Pearlin, 1996). There are also key life transitions that can be distressing, like children leaving the home, retirement, forced relocation, and losing a driver's license (Antonuccie, Akiyama, & Merline, 2001). As with earlier life stages, stressful life events, although usually rare, can have negative effects on health and well-being (Birditt, Antonucci, & Tighe, 2012). These include issues with cognitive, physical, and emotional functioning, as well as higher risk for disease and mortality (Kok et al., 2017; Aldwin et al., 2014). Moreover, when such events do occur, they are more likely to produce depression in older people than their younger counterparts (Ensel, 1991). In other words, stressful life events do not fade with age, but take on different forms that can be just as disruptive.

Daily Hassles

Generally, older adults report less daily stress than younger and middle-aged adults (Neupert et al., 2007; Stawski et al., 2008). This translates to fewer interpersonal conflicts and demands in the home (Almeida & Horn, 2005), as well as lower rates of work-related conflict (Neupert et al., 2007). However, there are unique hassles that emerge at this stage including worrying about health and money, problems with grandchildren, and feeling lonely (Vezina & Giroux, 1988). Although the overall frequency of stressors may decline with age, whether they have different impacts is another matter. Take, for instance, the effects of stress on affect, or one's emotional

reactivity to a situation. Positive affect refers to alertness, enthusiasm, and energy, while negative affect reflects distress and uneasiness (Watson, 1988). Stawski and associates observed that, while daily stress was experienced less often for older adults, it was still associated with more negative affect for both younger and older adults alike. Furthermore, the negative impact of daily hassles on overall health does not wane with age, as higher hassles are instead related to more reductions in health (Delongis et al., 1982).

Chronic Stressors

A major source of later life chronic stress is the strain associated with caregiving. Caregiving is another example of a social role that emerges with aging, in particular, middle to later life. It is characterized by ongoing duties to maintain the health of a spouse or parent with a debilitating condition such as Alzheimer's Disease. Caregivers have higher rates of depression and poorer health compared to those without caregiving responsibilities (Kiecolt-Glaser et al., 1991). Caregivers' wounds take longer to heal, they have higher mortality rates, and they show increased signs of aging and age-related diseases (Lutgendorf et al., 1999; Epel et al., 2004; Kiecolt-Glaser et al., 2011). In keeping with previous sections, childhood stressors like parental death or marital problems increases the ability for chronic stress like caregiving to lead to age-related diseases (Kiecolt-Glaser et al., 2011).

A key factor of chronic stress in older adulthood is disability, an impairment of one's physical or mental faculty or capacity to live independently (Fiksenbaum, Greenglass, & Eaton, 2006). Over one third of older U.S. adults have some disability (He & Larsen, 2014) which could include difficulty hearing, being wheelchair-bound, or having Alzheimer's Disease (Brault, 2012). Decreased functional ability can make tasks like bathing, climbing stairs, or using transportation more difficult. Thus, rather than being a source of stress itself, disability can influence the prevalence of other stressors. For example, decreased functional ability is related to more daily health hassles like worrying about one's health as well as physical distress symptoms like feeling weak (Fiksenbaum, Greenglass, & Eaton, 2006). According to two systematic reviews, disability has also been found to predict suicide in older adults (Lutz & Fisk, 2018; Fassberg et al., 2016). Such research supports the Interpersonal-Psychological Theory of suicide (Joiner, 2005) wherein having a disability may require increased assistance from friends or family, making one feel like a burden on others (Joiner, 2005). Moreover, disability can impede participation in activities with others, thwarting one's sense of belonging (Joiner, 2005). It should be noted however, that disability may also be related to depression which itself predicts suicide (Lutz & Fisk, 2018).

Factors that Reduce Stress in Later Life

Now we will discuss both the tried-and-true resilience and stress management factors, as well as those that may be unique to later life. As with early and middle life, coping that emphasizes problem-solving and emotion regulation, rather than avoidance, is related to lower chronic stress in later life (Murayama et al., 2019). Older adults differ, however, in their default coping mode. For example, older men and women tend towards passive strategies like emotional denial and avoidance when it comes to interpersonal stressors, like family conflict. On the other hand, older people use problem-focused approaches when issues are instrumental in nature, like trying to

accomplish or get better at something (Blanchard-Fields, Mienaltowski, & Seay, 2007). This differs from younger adults that use planful problem-solving regardless of the situation. Why the difference in approach? Strategy selection. Older adults rely on the context of the situation to decide which strategy to take in order to optimize resources. Should I expend more effort in this debate about gun control with my granddaughter? Or would it be less stressful and more energy-efficient to simply change the subject? In this way, problems worth tackling become problems best solved, possibly explaining some research showing older adults to be better problem solvers than their younger counterparts (e.g., Blanchard-Fields, Mienaltowski, & Seay, 2007).

Other factors that are protective against the negative impacts of stress include social and psychological resources. Essentially, these are reserves that are relied on when appraising possible threats. Social resources include social support availability and satisfaction (Chow & Ho, 2012). Psychological resources include one's sense of personal control, competence or mastery, and meaning or purpose in life (Lim et al., 2015). In tandem with our balloon metaphor, these resources characterize the elasticity with which we can stretch, or adapt, to a given stressor. The level of threat perceived from the situation and the ability to cope with the stress hinges on how much resources are available (Lazarus & Folkman, 1984). Research in older adults has shown that having adequate psychosocial resources can help prevent depression that emerges from late life stress (Lim et al., 2015). For instance, in order to combat the negative effects of caregiving on depression, caregivers require life goals that they value and find meaningful (Chow & Ho, 2012). Furthermore, these resources can be improved through training and intervention. Resources like perceived control and competence can be enhanced using psycho-educational programs, cognitive therapies, and behavioral methods (Lim et al., 2015), which, in turn, have been shown to improve depressive symptoms in older adults (Zautra et al., 2012).

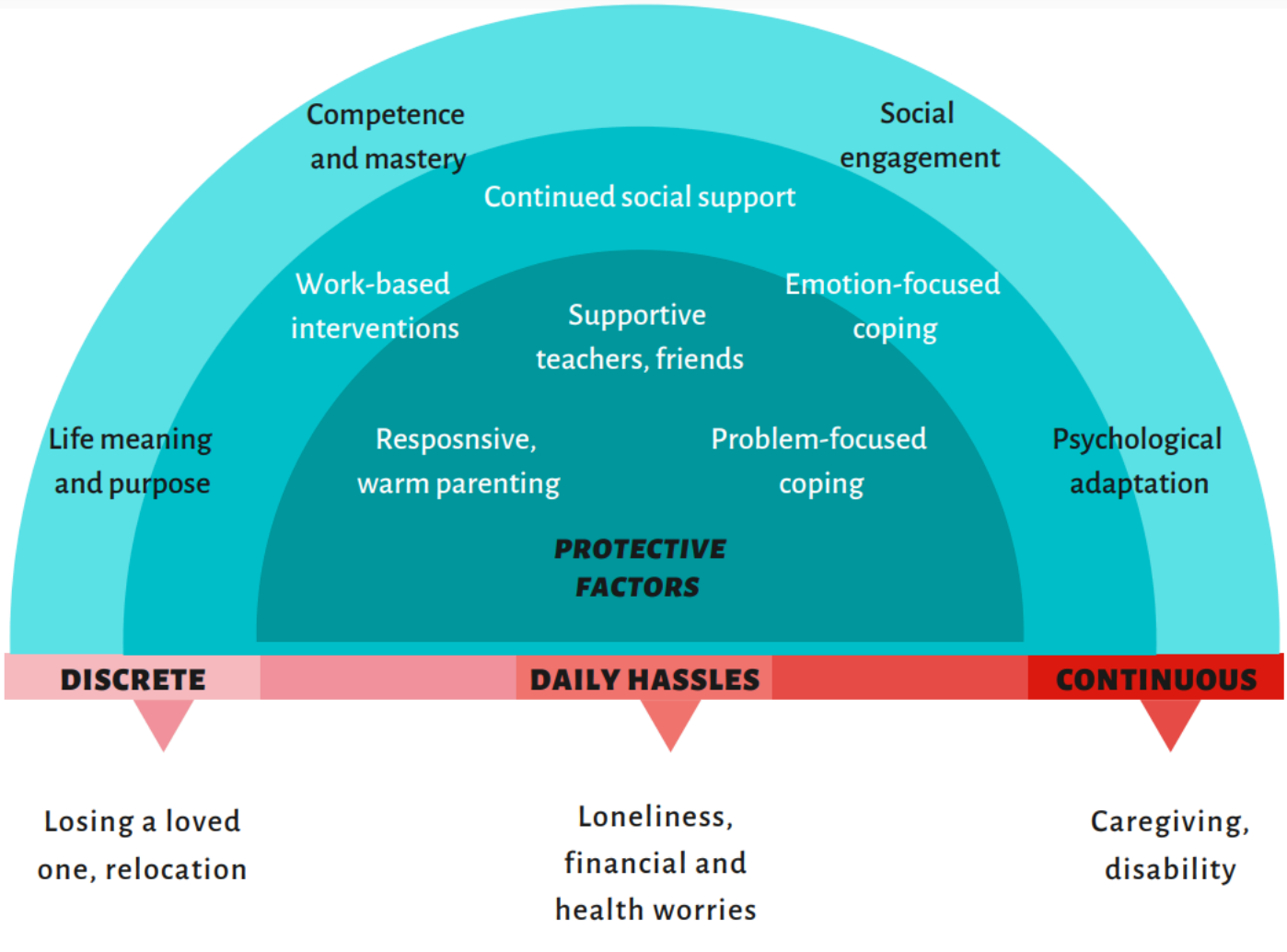
As we discussed in the early life section, many who encounter debilitating stressors go on to be normal, healthy adults. This brings us to successful aging, which refers to keeping or reacquiring good physical, mental, and social functioning in later life (Rowe & Kahn, 1997). A successful aging trajectory is more attainable when we can overcome the negative impacts of stress. For instance, stressful life events, both recent (e.g., widowhood) and long passed (e.g., parental divorce) lead to worse successful aging (Hsu, 2011; Kok et al., 2017). Chronic stressors like disability and caregiving can also undermine successful aging (Frias & Whyne, 2015). Additionally, poverty or economic hardship further exacerbates some of these influences, with childhood poverty related to more early life events like parental divorce, which in turn, predicts even worse successful aging.

So, what factors promote successful aging? A review by Kim and Park (2017) identifies four things that people should strive towards: 1) avoid diseases and disability, 2) maintain high physical and cognitive function, 3) prolong engagement with life, and 4) achieve psychological adaptation. While avoiding ill health and maintaining good function are undoubtedly robust components, prolonging engagement and psychological adaptation are particularly relevant to the link between stress and successful aging. Psychological adaptation is characterized by how people perceive and value their lives, as well as their levels of life satisfaction and purpose. On the other hand, prolonged engagement is comprised of feeling highly productive and socially

active. What does this mean in terms of dealing with stress? The authors assert that, although cognitive and physical deterioration is unavoidable, being socially active and psychologically adapted nonetheless helps us achieve successful aging. Furthermore, health professionals can play a decisive role in promoting adaptation and engagement through interventions and programs as well as channeling optimism and future-oriented viewpoints when caring for older adults. In doing so, health professionals can facilitate a positive perception of the aging process, life satisfaction, and one's purpose in life, all of which underpin successful aging (Kim & Park, 2017).

Summary

Late age discrete stressors, although less common than earlier in life, take on new forms such as widowhood or retirement and are more likely to produce depression in older individuals compared to younger people. Similarly, daily hassles are experienced less by older adults including fewer interpersonal conflicts and work demands but can induce negative emotions and physical reactivity in older adults on par with their younger counterparts. Chronic stress is also less common and may stem from physical issues, economic hardship, and caretaking responsibilities which can precipitate aging and age-related disease. Maintaining psychological and social resources like competence and social satisfaction, as well as using problem-focused coping, promotes resiliency in the face of late life stress. Remaining socially engaged and psychologically adapted helps promote successful aging even when facing the distress of cognitive and physical decline.



The continuum with added examples of later life stressors and protective factors

Traumatic Stress

Trauma is characterized by experiencing severe harm, or the threat of harm, such as interpersonal violence, an accident, or a natural disaster (Finkelhor et al., 2015). When exposed to a traumatic event, the person may experience traumatic stress, a psychological response to prolonged activation of the body's stress response system (Bagneris et al., 2021). The criteria for posttraumatic stress disorder (PTSD) are met when this stress response is still present after 30 days and presents certain symptoms. These include intrusion (interfering thoughts related to the trauma), avoidance (preventing exposure to possible triggers), and altered cognition, mood, and excitability (American Psychiatric Association, 2013).

In essence, PTSD emerges from extreme levels of stress, exerts the heaviest of psychological and physical burdens, and dishes out the most severe stress outcomes in both the short- and long-term. Here our balloons are stretched well beyond their elastic limits - we are dealing with overbearing demands and are underequipped to cope. Our developmental circuitry becomes damaged, hindering our capacity to regulate emotions, socialize, and succeed in school and at work. As with other forms of stress, early life plays a crucial role in the trajectory of trauma and PTSD, with more severe outcomes resulting from earlier and more chronic trauma. However, there are still many who face such turmoil and escape relatively unscathed – in fact, only 6-8% of those who experience trauma go on to develop PTSD (Atwoli et al., 2015). More on this to come. For now, we will discuss how trauma and PTSD – Pennywise in his most threatening guises – appear in early life.

Traumatic Stress in Early Life

Early life trauma can take the form of physical abuse, any nonaccidental physical injury perpetrated by a caregiver, or sexual abuse, the involvement of the child in sexual activity to provide gratification or financial benefit. Furthermore, psychological, or emotional maltreatment consists of acts outside of physical or sexual abuse that causes conduct, cognitive, or mental disorders and may take the form of verbal abuse or excessive demands. Finally, neglect occurs when there is a failure by the caregiver to provide care while being financially able to do so and could entail food, clothing, or shelter deprivation. (Trickett et al., 2011)

It is estimated that nearly 16% of children develop PTSD after experiencing trauma with rates higher for girls (28%) than for boys (11.1%) (Alisic et al., 2014). Early life PTSD is associated with more turbulent friendships as well as less positive emotions in activities and relationships (Parker & Herrera, 1996; Salzinger et al., 1993). Abused children and adolescents are rated by their peers as withdrawn and aggressive, as well as being less likable, cooperative, and sociable (Anthonysamy & Zimmer-Gembeck, 2007). Childhood physical abuse has been shown to contribute to peer alienation and violent behaviors that culminate in antisocial behavior in adolescence (Egeland et al., 2002). Furthermore, abused children and adolescents are more likely

to associate with delinquent peers leading to greater delinquent behavior themselves (Negriff & Trickett, 2008).

The buck doesn't stop here however, with trauma having far-reaching effects into adulthood and older age. Traumatic stress can result in severe consequences for a child's development and can increase the likelihood of developing mental, emotional, and behavioral disorders (McEwen & McEwen, 2017). Victimized children and adolescents are at risk for poor later life outcomes including anxiety, depression, and substance use disorders (DeBellis & Zisk, 2014). Finally, early traumatic experiences increase the odds of an adult having antisocial behavior such as violence, and relationships akin to those that were traumatizing in early life (e.g., staying with an abusive partner) (Sapolsky, 2012, p. 194).

Reducing Traumatic Stress in Early Life

Earlier in this chapter we discussed the protective factors for different types of stress in childhood and adolescence. Like negative life events in childhood, parenting can play an important role in the child's adjustment to traumatic stress as well. For example, in situations of imminent danger, where trauma may potentially occur, parental overreaction, uncertainty, or conflict may jeopardize child outcomes (Pynoos, Steinberg, & Piacentini, 1999). There is also the notion of trauma reminders, situations or stimuli that re-immerse the child into the trauma which can maintain negative effects on well-being. If the parent reacts to these reminders with avoidance or anxiety, it can increase the child's posttrauma distress (Pynoos, Steinberg, & Piacentini, 1999).

What can parents do to increase recovery? For starters, providing consistent and emotionally responsive care throughout the child's development is crucial. Building this secure attachment facilitates children's ability to calm themselves, create their own supportive relationships, and can be protective against genetic vulnerabilities to early adversity (Carlson et al., 2016). Given that successful adjustment to PTSD relies on the ability to process the environment, parents should also promote the use of cognitive strategies. This means learning to regulate emotions in the face of triggers rather than simply avoiding them.

Let's imagine for instance, that our friend Richie was bitten by a dog as a small child. For months following the incident, and to prevent a public meltdown, he and his parents collectively avoid walking near the park (or anywhere else that may have lots of dogs). Although this is a quick and easy remedy to reduce distress, it effectively atrophies Richie's ability to process the trauma. In other words, by avoiding potential stressors, Richie's parents are preventing him from learning how to update his reactions to them. Ideally, parents should try to discuss the traumatic experience with the child given that this can promote the child's reappraisal and correct his or her misconceptions (Salmon & Bryan, 2002). Furthermore, parents can reinstate pretrauma routines as another way to support recovery (Williamson et al., 2016). Rather than fall into overprotective monitoring and changing daily routines, promptly resuming activities like school can provide a sense of structure that promotes adjustment (Williamson et al., 2016).

A number of interventions have been shown to improve outcomes and reduce symptoms. For example, Child and Family Traumatic Stress intervention (CF-TSI) is implemented within 30-45

days of a traumatic event and aims to reduce symptoms by increasing communication and support from the family. The most promising interventions however are those that utilize cognitive behavioral therapy (CBT) and prolonged exposure. CBT retrains people to think logically when reacting to a trauma emotion and usually involves education, relaxation training, and exposure (purposefully reintroducing traumatic situations). For instance, if being disciplined by a teacher triggers a traumatic fear response, the student would be trained to reason that such fear is emerging due to a past experience, not the teacher. On the other hand, prolonged exposure seeks to modify the memory of the trauma before it is consolidated (Birur et al., 2017). For example, a psychologist may, over several sessions, support the patient in imagining the fearful situation while facilitating coping. CBT has been shown to be the most effective treatment for trauma exposure and PTSD for children and adolescents with even better symptom reduction when paired with prolonged exposure (Birur et al., 2017).

Traumatic Stress in Middle Life

In a 2017 international research project led by Kessler and associates, the World Health Organization (WHO) examined 50,855 adult respondents regarding the prevalence and frequency of trauma and PTSD. The most common source of trauma was witnessing harm (35.7% of respondents), experiencing an accident (34.3%), and the unexpected death of a loved one (31.4%). The next most common trauma types were physical violence (22.9%), intimate partner sexual violence (14%) and war-related traumas (13.1%). While traumas involving interpersonal violence were more likely to occur in adolescence and early adulthood (17-18 years old), war-related trauma, accidents, and witnessing harm were more likely to occur later on (ages 24-31).

How often did these traumas result in PTSD? According to the report, the highest conditional risk was violence (40% of those affected met PTSD criteria), either via rape (19%) or physical abuse (11.7%). The next highest risk for PTSD was being kidnapped (11%) and being sexually assaulted other than rape (10.5%). Regarding acute versus chronic traumatic stress, the WHO report found that prior exposure to some forms of violence (physical and sexual) was associated with increased vulnerability to subsequent diagnoses of PTSD. Indeed, several others have reported previous trauma exposure as a risk factor for later PTSD (e.g., Robin et al., 1997; Rodriguez et al., 1998; Yehuda et al., 1995).

What might be going on here? There is suggestive evidence that certain neurobiological changes underwrite a greater propensity towards later PTSD (Pynoos, Steinberg, & Piacentini, 1999). Remember that stress machinery we discussed earlier? Early and repeated traumatic stress acts like a devious saboteur continuously dismantling and rearranging stress machinery, overwhelming repair prior to adulthood. This includes alterations to the autonomic nervous system (Perry et al., 1995), the HPA axis (Stein et al., 1997), stress hormones (Resnick et al., 1995), and structural brain changes (Bremner et al., 1997). Given enough opportunities, Pennywise can wreak havoc on more and more systems involved in stress and emotion regulation.

Like other forms of stress, adulthood PTSD has both short- and long-term effects that worsen with more stress exposure. These effects range from general consequences on quality life, to

mental or psychological implications and clinical vulnerabilities. Impacts on quality of life include trouble with employment, marital problems, and child-rearing difficulties. Mental consequences of PTSD include impairments in impulse control, goal-directed behavior, and general negative coping styles (Cusack et al., 2019). Clinical consequences of PTSD include increased rates of psychiatric comorbidity, such as depression, substance use disorders, anxiety and panic disorders, and suicidal ideation (Cusack et al., 2019). Generally, negative outcomes increase with more traumatic experiences or early life exposure. For instance, childhood victimization or maltreatment is a risk factor for the leading causes of death in adults (Felitti et al., 1998).

Reducing Traumatic Stress in Middle Life

So, how do we escape Pennywise's traumatic grasp? As we mentioned earlier, PTSD fortunately only develops in a small minority of people. And as it turns out, there are factors beyond parenting and early life intervention that buttress our chances. A couple of such characteristics include optimism and psychological flexibility. Dispositional optimism is the tendency to expect more good things to happen than bad (Carver & Scheier, 2014). Greater optimism has been shown to predict more resilience and less symptoms for child abuse survivors (Domhardt et al., 2015) as well as modulate the severity of PTSD symptoms as victims enter adulthood (Chen et al., 2021). How does this work? Highly optimistic individuals are more likely to adapt and exert effort to manage stress rather than merely disengaging (Carver, Scheier, & Segerstrom, 2010). These folks are more likely to use positive coping strategies like focusing on the problem, seeking out social support, and making positive reinterpretations of the stressor (Scheier, Weintraub, & Carvery, 1986).

Psychological flexibility is the ability to adapt to different situations through acceptance and fully experience all thoughts and feelings; it also means using one's goals and values to make life decisions (Hayes, Strosahl, & Wilson, 1999). Work by Richardson and associates (2019) demonstrated that adults with greater psychological flexibility were less negatively impacted by early life trauma (i.e., lower levels of PTSD and depression symptoms). This may imply that individuals who are better able to flexibly adapt to situations, accept their full experience (e.g., thoughts and feelings), and use a values framework for guiding important decisions are resistant to negative impacts of early life trauma (Richardson et al., 2019).

As with early life trauma, adulthood trauma-focused interventions that emphasize cognitive behavioral therapy and prolonged exposure remain the gold standard. Eye-movement desensitization and reprocessing (EMDR) is another trauma-focused approach that shows promise. In EMDR, the patient discusses the traumatic event while attending to a back-and-forth motion object or oscillating sound. The clinician then guides the patient to engage in positive thinking and beliefs to reorient the trauma memory with positive feelings. In a systematic review of PTSD interventions, Ehring and colleagues (2014) found trauma-focused interventions like CBT and EMDR to lead to decreased PTSD symptom severity as well as lower rates of co-occurring conditions like dissociation.

Traumatic Stress in Later Life

Traumatic stress in later life is relatively more complicated than previous life stages. Generally, PTSD at this stage is less common compared to early and middle life (Botche et al., 2012), reaching as low as 3% in community-dwelling adults who have experienced trauma (Pless Kaiser et al., 2019). However, late age PTSD is more likely when exposure to trauma occurs early in life, for instance, in individuals who experienced war or the Holocaust (Peters, 2021). Furthermore, it has been found that PTSD symptoms increase in tandem with bereaving a loved one although these dissipate within 6 months (Elklit & O'Connor, 2005).

To further complicate matters, the elderly may present trauma-related risks that are unique compared to PTSD suffered by their younger counterparts. For example, PTSD is associated with accelerated cognitive aging (Lapp et al., 2011) and up to a fourfold greater risk of dementia (Yaffe et al., 2010). Additionally, age-related decline in the ability to focus on relevant information and inhibit irrelevant information have been theorized to worsen the intrusion of trauma-related memories (Floyd, Rice, & Black, 2002). In turn, the intrusive memories can further impair cognition resulting in a cycle of psychiatric and cognitive dysfunction (Schuitevoerder et al., 2013). Experiencing trauma can also increase a person's subjective age, a marker of health (Stephan et al., 2013) and successful aging (Palgi et al., 2019). It is theorized that PTSD symptoms undermine the maintenance of a young age identity thus preventing its ability to buffer against stressors into old age (Hoffman et al., 2016). Finally, PTSD can exacerbate several other age-related health issues such as a higher risk of disability, chronic illnesses like Chronic Obstructive Pulmonary Disorder, and chronic pain conditions like arthritis (Kaiser et al., 2019).

An important factor when considering trauma in later life is gender. A 2010 study by Ditlevsen and Elkit examined PTSD symptoms of 6,548 men and women ranging from 16 to 75 years old. Overall, women showed a twofold higher PTSD prevalence than men. When considering age, the highest prevalence of PTSD was in the early 40s for men and the early 50s for women. Strikingly, women in their early 50s were three times more likely to have PTSD than men of the same age group.

What may explain the discrepancy? The authors offer two possible mechanisms, one that pertains to identity and another that is neurobiological. With regard to the first, PTSD prevalence appears to fluctuate in tandem with key identity transitions throughout female life. Symptom prevalence increases in early 20s where identity formation and sense of self is being developed (Dunkel et al., 2009), potentially increasing vulnerability for traumatic stress to occur (Ditlevsen & Elkit, 2010). Prevalence then plateaus from 20-40 years old during which identity stabilizes through events like marriage and choosing a career - bringing about meaning and life satisfaction which can be protective from PTSD.

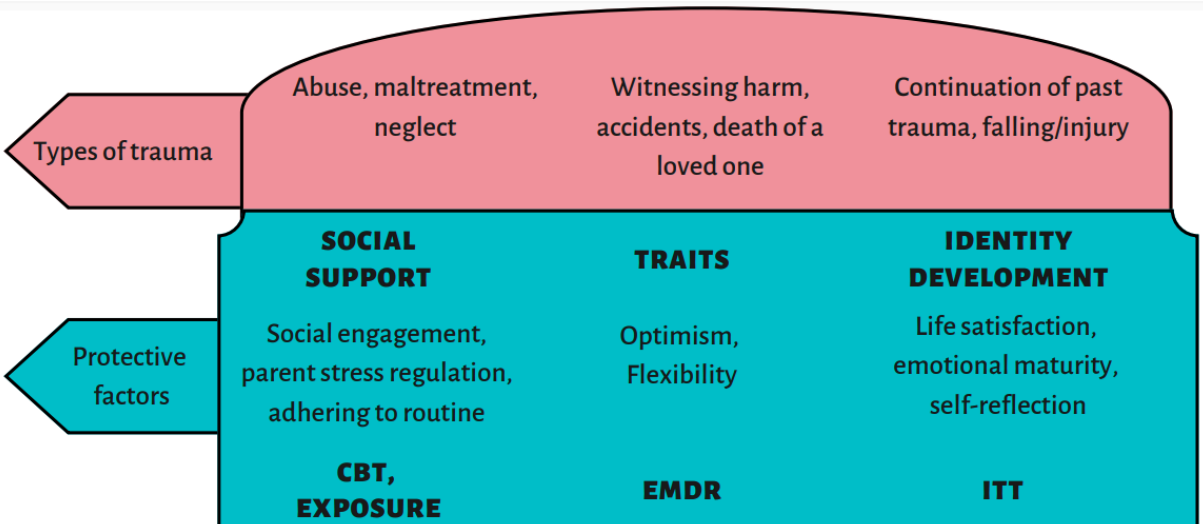
When entering the 50s however, PTSD prevalence increases dramatically and warrants an explanation that accounts for hormonal changes that accompany this transition. Fluctuations in women's reproductive hormones have been found to impact their sympathetic nervous systems - the fight or flight machinery (Rasmusson & Freidman, 2002). Furthermore, menopausal women show increased cardiovascular and hormonal responses to mental stress compared to pre-menopausal women (Saab et al., 1989). Finally, PTSD symptoms have been shown to be associated with cardiovascular activity in post-menopausal women (Newton et al., 1999). Thus,

the spike in PTSD prevalence women's early 50s – where the transition from pre- to post-menopause occurs – may be explained by neurobiology as well changes in self-perception, social activity, and social gender roles (Ditlevsen & Elkit, 2010).

Reducing Traumatic Stress in Later Life

So, how does one fend off the fangs of late-age PTSD? You guessed it: secure relationships, social support, and a holster of problem-focused coping (Ogle, Rubin & Siegler, 2016). Perhaps paradoxically, however, the process of aging may provide another protective factor. We have seen how early life, and late-onset trauma (as well as gender) can complicate the general decline of PTSD into older age. Despite these important factors however, PTSD indeed becomes increasingly rare closer to 60 and 70 years old (Ditlevsen & Elkit, 2010). What are the mechanisms? One factor may simply be more resilient coping styles, made possible thanks to a tall order of intellectual and emotional maturity (Janoff-Bulman, 1992). Another, suggested by Ditlevsen and Elkit (2010) derives from Erikson's eighth and final stage of development – the crisis of ego integrity versus despair. The eighth stage pertains to reconsidering life and accomplishments, and if successful, leads to ego integrity, wisdom, and life satisfaction (Erikson, 1998) which may serve to protect against traumatic experiences and their symptoms. A third mechanism is the decrease in self-occupation and increase in quiet reflection that accompanies old age, which can promote life satisfaction, acceptance of death, resilience, and coping strategies (Ditlevsen & Elkit, 2010).

The research surrounding late life interventions for PTSD is still wanting. However, Botche and colleagues (2012) review several promising treatments including cognitive therapy (CT), exposure approaches, and integrative testimonial therapy (ITT). CT aims to unearth traumatic perceptions, feelings and thoughts and use cognitive restructuring to build functional meanings of the trauma in order to develop a coherent life story (Botche et al., 2012). While CT has shown promising results for young- and middle-aged adults, only a couple of studies have found benefits for older adults on measures of anxiety and well-being (Ayers et al., 2007), and none on PTSD symptoms per se. Exposure approaches, on the other hand, appear beneficial for war veterans and childhood sexual abuse victims, demonstrating reduced PTSD symptoms (Gamito et al., 2010; Russo et al., 2001). Finally, ITT is tailored specifically for older adults who experienced early life trauma such as war-related events. The goal of ITT is to focus on and reinforce positive memories and help to integrate the traumatic events into a coherent and balanced life story. Some preliminary work has found ITT to be effective in reducing PTSD and related anxiety stemming from childhood trauma and showed that the improvements were maintained after six months (Knaevelsrud et al. 2009).



Examples of trauma, protective factors, and possible outcomes across the lifespan

Summary

There's a first century Greek legend known as "The Ship of Theseus" that can help us think about stress across the lifespan. As they sailed back to Crete, Theseus and his crew of young Athenians continuously replaced each plank and part of their ship as they were damaged until none of the original pieces remained. Although this tale has conceived a line of philosophical inquiry - whether an object whose components is totally replaced remains to be the same object – it also illustrates, for our purposes, the process of development and stress.

To consider how, let's take stock of what we know so far. We are born with a finite set of resources that are delicately arranged for optimal development and utilization – our ships. The arrangements that underpin our emotion regulation, decision-making, and behavioral control are further constructed from the outside in - by our parents, friends, and teachers - as we grow. Stress can damage the ship, especially if early sailing takes us through the treacherous seas of bullying and poverty. In most cases, however, the planks are reconstructed in time thanks to our crews of Athenians – responsive parenting, caring friends, and problem-based coping.

However, a particularly destructive storm, trauma, and PTSD, can cast children into rocky relationships, less positive emotions, aggression, and down a path towards delinquency. Fortunately, most of us escape early trauma thanks in part to parents that provide consistent support and help us stick to our routines in the face of challenges. Child and Family Traumatic Stress Intervention and cognitive behavioral therapy (CBT) can also redirect us onto happy and successful trajectories post-trauma.

Depending on the hull integrity, it's either smooth sailing or "Abandon ship!" as we encounter the new stressors of adulthood. If we had experienced multiple risk factors like poverty, harsh parenting, and bullying as we left port, the arch of our voyage is that much harder. For instance, we're worse at regulating emotions and have disproportionate responses to stressors ranging in seriousness from an argument at work to divorce. While such a trajectory precipitates conditions like adulthood depression and anxiety, social support and work-based interventions like cognitive-behavioral training can refurbish the ship as we continue into older adulthood.

If early PTSD sticks around into adulthood, and is combined with more trauma, it can clog the stress machinery that shares its networks with other vital systems like our autonomic nervous system, hormones, and brain structure. Dispositional optimism, seeing the better side of blue, and psychological flexibility, accepting the feelings that new situations bring, can provide shielding from PTSD's harsh blows. Add to that our trusty CBT and exposure approaches, and we have an ever-clearer map of escape routes from early and middle life PTSD.

At this point we must consider, has the replacement of the ship's planks outpaced its loss? Have contextual stressors like poverty impeded the growth of our stress management circuitry? And has life's stressful events, daily hassles, and chronic demands taken advantage of this vulnerability? If the answer to this last question is yes, successful aging – maintaining good

physical and mental health – is much harder to come by. Furthermore, the burdens associated with caregiving and disability pose threats like age-related diseases and an increased risk of suicide. It is imperative that we keep problem-focused coping in our repertoire in favor of passive coping tendencies like withdrawing. Selecting situations that promote competence, mastery, and less energy expenditure further protects against stress-induced conditions like depression. Social engagement and psychological adaptation are important north stars guiding us to successful aging amidst the foggy bluffs of physical and cognitive decline.

With regard to PTSD, our chances of experiencing the disorder appear lower in later life, but still depend largely on whether early life trauma still lingers – perhaps in the form of combat memories or abuse. If so, late life PTSD can be uniquely debilitating by worsening other age-related health issues such as dementia, disability, and chronic pain. Succeeding through developmental points like the ego despair vs. integrity stage, as well as an increasing tendency towards self-reflection, can provide life satisfaction, resilience, and coping which can stave off PTSD's harmful effects. If PTSD continues to rear its head, certain interventions – although scarcely studied – do show promise, such as cognitive, exposure, and integrative testimonial therapies.





Whether our ships sail happily into the sunset largely depends on early life stressors as well as later life outlooks and strategies

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The various forms of stress have the potential to deal a range of blows to our emotional, social, mental, and physical health, even targeting some of us more readily than others. Although the origins and facilitation of stressors may not seem under our control, there is a bounty of characteristics, strategies, and interventions that we can utilize. Perhaps most importantly, it is when we arm ourselves with knowledge about stress – its underlying processes, risk factors, and outcomes – that we can overcome its many guises. I expect that this chapter added to your knowledge on at least one of these fronts, and it is my hope that any knowledge gained here will continue to help you throughout life.

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