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DEVELOPMENT AND VALIDATION OF A LEISURE EUSTRESS-DISTRESS SCALE

BY

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DISSERTATION

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ABSTRACT

Despite that the term ‘stress’ was originally suggested as a non-directional construct (Selye, 1936), popular beliefs about stress and its colloquial use of the term often remained one sided (i.e., distress: negative aspects). Thus, most existing studies have only examined the baseline of the concept. Also, a valid and reliable measurement scale of eustress is very limited, as none exists within the context of leisure. In order to fill this gap, this dissertation examined how older adults differently perceive their leisure related stressors. More specifically, the overall aim was to develop a scale that measures leisure-based eustress and distress and evaluate its reliability and validity.

In order to construct and validate Leisure Eustress-Distress Scale (LEDS), two phases of study were conducted. The first phase of this study, which was developing and refining items, consisted of three parts: interviews, panel of experts’ review, and a pilot study. For the interviews, telephone/online semi-structured in-depth interviews were conducted with 23 older adults who were recruited from the UIUC’s E-week Newsletter and listserv. From the interviews 83 items were initially created. After four rounds of refinement, the number of items were reduced to 42, which was finalized for the review from panel of experts. Five experts in the field of leisure and aging served on the expert panel to evaluate the items for the LEDS and to evaluate content validity. Based on expert panelists’ feedback, 13 items were revised, and 10 items were removed, leaving LEDS with 32 items. Also, the measurement was revised from a 6-point Likert scale to 5-point Likert scale with clearer wording. Lastly, a pilot study took place to receive final feedback and comments of the overall LEDS. Recruited from the pool of older adults from E-week listserv, 55 older adults participated in the Qualtrics survey. Based on the

feedback from pilot study, brief instructions were given before each LEDS – Eustress and LEDS – Distress, so participants could better switch gears between the two scales.

The second phase of this dissertation was the target study to construct and validate the LEDS. First, the internal structure of the LEDS was evaluated. coefficient alpha and inter-item correlation indicated that both LEDS – Eustress and LEDS – Distress had a strong reliability. Next, Kaiser-Meyer-Olkin (KMO) and Bartlett's test was conducted and confirmed that the data is a fit for an exploratory factor analysis (EFA). The Kaiser's criterion and the scree plot test results indicated suggested three factors for LEDS – Eustress and two factors for LEDS – Distress. With three and two factors for eustress and distress scales, common factor analysis was conducted, and seven items were dropped due to their low communality and cross-loading/small loading value. Each factor was then interpreted and was labeled as physical, psychological, and environmental.

Results obtained through the EFA were then subjected to confirmatory factor analysis (CFA). Using multiple fit indices to obtain holistic view of goodness of fit, chi-square, root mean square error of approximation (RMSEA), the comparative fit index (CFI), and standardized root mean square residual (SRMR) were assessed. As a result, RMSEA, CFI, and SRMR values were all within the recommended guideline, therefore CFA showed good model fit of LEDS.

To validate the LEDS, construct and criterion validity were checked. Convergent and discriminant validity were checked to secure construct validity with average variance extracted (AVE) values and its relationship with squared correlations value. As a result, convergent validity was met, however good discriminant validity of both LEDS – Eustress and LEDS – Distress was not achieved. Next, concurrent and predictive validity were checked to secure criterion validity using the results of reworded adolescent distress-eustress scale and leisure

satisfaction scale. LEDS – Distress had overall acceptable concurrent and predictive validity, however, LEDS – Eustress did not have acceptable validity for both scales. Further discussion and explanation on some of the results are included in the discussion chapter, as well as the theoretical/practical implication, limitations, and recommendation for future research.

*Dedicated to our father in heaven for his grace and glory,
My wife, Jeongeun, for shaping my heart and soul,
My parents, Byungkuk and Younae, for your unconditional love, and
My mentor, Laura, for your encouragement and faith*

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CHAPTER 1: INTRODUCTION

Although negative effects of stress are prevalent across the lifespan, older adults are particularly vulnerable (Cairney & Krause, 2008; Lazarus, 1999). The effects of stress among older adults include the emergence and expansion of psychological and physical health conditions, such as decreased immune and autonomic nervous system function, and an increase in anxiety and depression (Chang, 2015; Vasunilashorn, et al., 2013). Moreover, older adults are more prone to experiencing daily stress especially after retirement (Hunter & Gillen, 2009; McHugh & Lawlor, 2013). Even though they may be free from occupational stress after retirement, findings from one study indicated that half of older adults still faced at least one major stressor per day and over 10 percent of the participants' encountered and experienced stress from multiple stressors (Almeida, Wethington, & Kessler, 2002). Given this segment of the population tends to encounter stressors that are more directly related to their own health (e.g., major functional decline, emergence of new chronic condition), stress can be a detrimental experience in their daily lives. Daily stresses have a powerful influence on people's well-being, by having separate and immediate effects that are confined to a single day, and by piling up over several days to create lasting irritations and frustrations (Almeida, 2005). Therefore, managing stress levels of older adults is vital to maintaining their well-being and quality of life.

As coping with stress has been one of the major concerns among scholars over the past 25 years or so, various resources that facilitate coping such as improved self-esteem and social support have been examined (Lou et al., 2010; Russell & Cutrona, 1991). Leisure has also consistently been identified as a significant resource for stress coping. In a seminal study, Reich and Zautra (1981) found that engaging in regular pleasurable activities was associated with lower levels of stress, especially among people who experienced a high level of daily stress. This was

due to the increased positive aspects of well-being in general which might have served as a buffer to the experience of distress. In another early study by Wheeler & Frank (1988), the authors identified four stress buffers and confirmed, that leisure was one of the four stress buffering activities.

Numerous research studying older adults in the context of leisure has suggested that social support and self-determination are two basic needs (Niyonsenga et al., 2012; Orsega-Smith, et al., 2007) which can contribute to psychological health and overall quality of life (Deci & Ryan, 2008). Findings from one of these more recent studies reported that self-determination can facilitate full processing of emotions related to stressful events over time, thus promoting enhanced emotional health and decreasing stress (Ntoumanis et al., 2009; Weinstein & Ryan, 2011). Furthermore, social support can reduce stress levels through emotional comfort or assistance from others to help resolve stressors (Chang & Yu, 2013; Lou et al., 2010). These two variables (i.e., social support and self-determination) that are positively related to managing stress can be fostered by engaging in leisure activities. Participation in leisure activities provides older adults an ideal opportunity to work on self-determination (e.g., providing an enjoyable experience to supplement their daily routines; Chang, 2012) and improve their level of social support (e.g., interaction with friends and family; Burnett-Wolle & Godbey, 2007). Coleman & Iso-Ahola (1993) also proposed that leisure-based social support and self-determination can effectively moderate the negative effects of stress on health. Additionally, including the hierarchical dimensions of leisure stress coping (Iwasaki & Mannell, 2000), there is much evidence on how older adults' self-determination and social support within the leisure context can help people to cope with stress (Chang & Yu, 2013; Hutchinson et al., 2008; Iwasaki, 2003; Iwasaki et al., 2005).

Designing adaptive programs to successfully manage stress have consistently been a goal for many disciplines including leisure studies. Despite efforts and some positive outcomes, leisure-based stress management programs also face limitations because a program cannot appeal to everyone's needs and situations (Bussing et al., 2010). Especially when dealing with such a subjective experience (i.e., stress), people have their own unique ways of responding to stressors (Chang, 2015). If 100 older adults were asked to define stress it is likely that they would all have (at least somewhat) different answers. In other words, when facing similar stressors, older adults are likely to have different reactions. Some may respond more positively to the same given stressors (e.g., perceiving stressful situations as a challenge to overcome or even as an opportunity) which is called 'eustress,' whereas others may react as if the stressor is a devastating threat which is called distress (Selye, 1987). This example of experiencing two totally different reactions is not a unique characteristic that only exists among older adults, rather it exemplifies the diverse ways in which human beings perceive stress. Yet, much of the research emphasis has been on the latter situation (i.e., reacting as a devastating threat to a given stressor) and even when we use the word 'stress,' it automatically links to the negative aspects stress (i.e., distress). Instead of only focusing on the experience of distress and treating it like a disease that must be managed or cured, the concept of 'stress' needs to be expanded so that both sides of experience (i.e., good and bad) can be highlighted and more clearly understood.

Background of the problem

Eustress or so-called "good stress" is a term first used and defined by Selye (1987). Where Selye defined stress as "...the non-specific response of the body to any demand placed upon it" (Selye, 1987, p. 17), he distinguished distress and eustress which used to be incorporated within the larger definition of stress. Following Selye's idea of differentiating

eustress and distress, Nelson & Simmons (2011) defined eustress as “positive psychological response to a stressor, as indicated by the presence of positive psychological state” (p. 59). Other scholars agreed that eustress is more than just the absence of distress, rather it encompasses positive states, attitudes, and emotions such as positive affect, meaningfulness, and satisfaction (Parker & Ragsdale, 2015; Zohar et al., 2003). It has been claimed that eustress might help to increase self-efficacy, replenish energy, and improve cognitive processing, which can also help reconstruct other resources such as thought-action repertoires, enabling creativity (e.g., trying new ways to reach a work goal), and flexibility (Gross et al., 2011). Also, eustress has been indicated to be an important predictor of life satisfaction followed by hope and self-efficacy among undergraduate students (O’Sullivan, 2011).

Despite the potential benefits of eustress in the context of one’s health and well-being, eustress has received very little attention in the literature. As Mesler (1993) stated in his dissertation, there are no adequate models, and relatively few studies proposing the concept and qualities of eustress. Even after Mesler’s (1994) publication, focus on eustress has been heavily geared towards management perspectives in occupational settings (Kung & Chan, 2014; Le Fevre et al., 2006) and amongst athletes (Trail et al., 2003) to increase performance.

Not surprisingly, the concept of eustress has not yet been thoroughly studied among older adults. Because a significant portion of older adults’ stressors (e.g., the death of a spouse, chronic conditions, moving to care facilities) are quite severe and devastating, the role of eustress in later life may seem less relevant. However, some theories (i.e., control theory and selective optimization with compensation framework) provide reasonable theoretical evidence to suggest the relevance of eustress and how older adults can experience eustress along with other segments

of the population. It is possible that promoting eustress can help older adults to cope with the consequences of aging and facilitate their healthy aging experience.

Statement of the problem/Need for the study

Le Fevre and colleagues (2003) found out that a search of PsycINFO for the years 1960 to 2003 using eustress as a keyword yielded 26 citations, nine of which were unpublished dissertations whereas 72,689 citations used stress as a keyword. As the concept of eustress has gathered limited attention in the literature it had been studied in its relationship to occupational stress (Kung & Chan, 2014; Le Fevre et al., 2003) and genetic expression (Sanchis-Gomar et al., 2012). Not surprisingly, eustress has not yet been studied among older adults in the context of leisure.

As the concept ‘eustress’ has rarely been researched in the past, very minimal attempts have also been made to measure this phenomenon. Due to the absence of a reliable and valid measurement scale for eustress, initial studies of eustress have involved construct definition and corresponding measurement approaches using physiological data, qualitative data and measures of indirect constructs. The physiological data have measured people’s changed blood pressure and heart rate (Bhat et al., 2011; Oksman et al., 2016) and semi-structured interviews have been adopted to understand the dimensions of eustress (Oksman et al., 2016). Moreover, indirect measurement of eustress has incorporated the presence of positive psychological states such as meaningfulness, positive affect, and hope (Nelson & Simmons, 2011; Simmons & Nelson, 2001).

Some studies have utilized a self-report Likert-scale directly measuring eustress (Cavanaugh et al., 2000; Gibbons et al., 2009; O’Sullivan, 2011), but there is some question about how well these scales have been evaluated for reliability and validity. In addition, all of the

existing eustress measurements are limited to only measuring work-related stress (e.g., acute and chronic) which automatically excludes an entire aspect on one's experience of daily stress and is not salient to those who do not work. Acute stress is a short-term stress such as an argument with one's boss whereas chronic stress is a long-term stress (e.g., constant arguments with one's boss on a regular basis). In a specific work setting where encountering numerous external stressors is inevitable, it is reasonable to focus on the acute and chronic stress. For older adults, however, routine challenges of day-to-day living (i.e., daily stressors) is a major concern due to multiple ongoing health conditions and lack of resources (e.g., transportation, loss of a spouse), Also, considering the fact that leisure engagement plays such a pivotal role in filling the abundant amount of free time of retired older adults and how it may impact on dealing with daily stressors, it makes more sense to consider daily stress when measuring eustress/distress for older adults. As previously mentioned, older adults are exposed to devastating stressors such as death of a spouse/friend, major health concerns, and/or moving to nursing/assisted facilities. However, it is likely that these stressors in later life are so prevalent in their daily lives that they experience them in an on-going way. Therefore, looking into older adults' daily stressors is necessary to better capture the experience of stress among older adults and to explain the phenomenon of both eustress and distress among older adults.

As indicated in the beginning of this chapter, leisure has been identified as a significant resource for coping and buffering distress (Reich & Zautra, 1981; Wheeler & Frank, 1988; Coleman & Iso-Ahola, 1993). In more recent years, additional models (e.g., moderation and mediation model, dynamic model of affect) have been proposed by researchers to suggest stress coping strategies within the context of leisure (Qian et al., 2014). Given the premise of leisure as a useful coping resource, the role of leisure in the experience of stress has been emphasized

among stress researchers (Folkman, 1997; Pressman et al., 2009). As it is evident that leisure has been established as being important to stress, the relationship between eustress and leisure may also be meaningful. Instead of only focusing on how to mitigate and cope with distress, the concept of eustress may deliver a new paradigm on how a stressor should be perceived especially among older adult populations.

Purpose of Study

The ultimate goal of this dissertation was to contribute to understanding of how older adults perceive their daily stressors in the context of leisure by developing a measure of both distress and eustress. More specifically, the purpose of this scale development project was to develop and begin to evaluate the validity and reliability of a Leisure based Eustress-Distress Scale. Research objectives included:

1. Develop a Leisure based Eustress-Distress Scale (LEDS) based on a combination of sources which include an experiential understanding from field research (i.e., interviews), a review of the theoretical and research literature, and experts panel review.
2. Establish a content adequacy assessment by testing for conceptual consistency of generated items.
3. Examine the factor structure by conducting exploratory factor analysis to reduce the set of items and confirmatory factor analysis to test the significance of the scale.
4. Evaluate and establish an internal consistency assessment to secure the reliability of the scale.
5. Provide initial support of construct validation by demonstrating evidence of content and convergent validity of this instrument and criterion validation by examining the predictive validity.

Definition of Key Terms

The following key terms will be defined as they are introduced in the text, and this list is provided as a reference to assist readers' understanding.

Acute Stress. (a) Episodic or temporal experience with stress (Hammen et al., 2009); (b) Related to life events that have a relatively clear onset and offset; (c) Short in length of the event exposure (i.e., stressor), duration of stress responding (i.e., emotional, behavioral, or physiological stress responses present for short duration), and duration of perceived threat (i.e., appraised threat or demand present for short duration (Baum et al., 1993).

Appraisal. The evaluative process that permeates a situational encounter with meaning for the person (Lazarus, 1966).

Chronic Stress. (a) “problems and issues that either are so regular in the enactment of daily roles and activities or are defined by the nature of daily role enactments or activities, and so behave as if they are continuous for the individual” (Wheaton, 1997, p. 53); (b) An excess of negative events in the 6 months prior to the onset of depression (Pancner & Jylland, 1996); (c) Long term in length of the event exposure (i.e., stressor), duration of stress responding (i.e., emotional, behavioral, or physiological stress responses present for long duration), and duration of perceived threat (i.e., appraised threat or demand present for short duration (Baum et al., 1993).

Daily Stress/Hassel. (a) A stressful reaction to a stressor that appears to be ‘ordinary and mundane’ (Caspi et al., 1987); (b) Routine challenges of daily living such as caring for other people, commuting between work and home, etc. (Zuzanek & Mangell, 1998); (c) Daily hassles often predict health status better than the life-event measures (DeLongis et al., 1982)

Distress. (a) “Damaging or unpleasant stress” (Selye, 1974, p. 20); (b) Distress is a negative response of either physical or psychological status when a person encounters certain stressors (Selye, 1964).

Eustress. (a) “A pleasant stress” (Selye, 1974, p. 20); (b) “Positive psychological response to a stressor, as indicated by the presence of positive psychological state” (Nelson & Simmons, 2011, p. 59); (c) Eustress involves a sense of control and positive association with the environment (Hobfoll, 1988); and (d) Eustress is a constructive and appropriate use of life or energy forces (Zerin & Zerin, 1986).

Stress. (a) “...the non-specific response of the body to any demand placed upon it” (Selye, 1987, p. 17); (b) “The pattern of specific and nonspecific responses an organism makes to stimulus events that disturb its equilibrium and tax or exceed its ability to cope” (Gerrig & Zimbardo, 2002, “S,” para. 74); (c) “Physical or psychological stimuli to which the individual responds to stressors” (Nelson & Simmons, 2011, p.57).

Stressor. The stressor will denote the external force or situation acting on the individual (Le Fevre et al., 2003).

CHAPTER 2: LITERATURE REVIEW

Eustress is a relatively understudied concept in general, and its connection with leisure and the older adult population has not yet been explored in the literature. In this literature review, these concepts are examined through the lens of psychology and leisure studies. Theoretical backgrounds that help to understand eustress are reviewed as well as existing measurements of eustress. Lastly, constructs that may be related to older adults' experience of eustress are explored.

Conceptualizing Stress

Since stress has a different meaning for different populations under different conditions, it is important to have some consensus of its definitions. The first and most generic definition of stress was proposed by Hans Selye. Selye (1936) initially accepted this phenomenon as a syndrome of just being sick from a biological science perspective; however, some years later he constructed an engineering term 'stress' to cover this typical body response (Selye, 1964). According to Selye (1987), stress is "the nonspecific response of the body to any demand for change" (p. 17). Although his foundation and starting point to explore stress was based on biological perspectives, Selye (1975) systematically provided evidence and he did not ignore the cognitive or psychological factors of stress. Besides, a recent analysis and review on the works of Selye suggests that he fully understood not only the biological aspects of stress on human beings, but also the psychological stress (Fink, 2009).

Selye (1976) in his book *Stress in Health and Disease*, included other definitions of stress from the perspectives of different disciplines such as behavioral science, neuroscience, and cognitive psychology. Selye specifically mentioned Richard Lazarus, famous for his work on

cognitive psychology with focus on emotions and he acknowledged the importance of how Lazarus underscored the difficulties of reaching a precise universal definition of stress. According to Lazarus (1971), scientists of many disciplines conceptualize stress, but each field seems to have something different in mind concerning its meaning. For instance, sociologists view stress as social disequilibrium, that is, conflicts in the social structure within which people live. Engineers conceive stress as some external force, which produces strain in the materials exposed to it, and physiologists focus on physical stressors that include an extensive range of stimulus conditions (e.g., acute and chronic conditions, nerve and muscle reactions, cardiovascular failure). The point is that stress is a multifaceted and complicated concept, but more importantly it is difficult and unnecessary to consider all of its potential meaning when conducting research. In this study, rather than focusing on the biological aspects of stress (e.g., perceiving it as a disease and physical response of body), more emphasis on the cognitive and psychological approach of understanding and determining stress (e.g., appraisal process of the stressor) is taken.

Although Selye's original definition meant to suggest a non-directionality view of stress, popular belief about stress and its colloquial use of the term often remained one sided (i.e., negative aspects). Many years later, The American Psychological Association (APA) has kept true to this non-directional definition of stress where they defined stress as "the pattern of specific and nonspecific responses an organism makes to stimulus events that disturb its equilibrium and tax or exceed its ability to cope" (Gerrig & Zimbardo, 2002, "S", para. 74). The reason for emphasizing this non-directionality is because Selye originally conceptualized stress in ways that it can be perceived and manifested both negatively and positively (Selye, 1975) which sets up an essential foundation of defining and distinguishing eustress and distress.

According to Selye's model, a person's body automatically reacts when encountering a stressor as a physiological stress response. However, interpretation and outcomes of this stressor can either be negative or positive. This evaluation or appraisal process is when a person determines the directionality of stress whether to construe it as something negative (i.e., distress) or something positive (i.e., eustress). Therefore, a psychological approach to understanding stress remains a key portion of understanding eustress and distress. Throughout this study, the term "stress" is used to describe the general physiological arousal to a stressor without any direction, whether negative or positive, "distress" is used to describe a negative reaction to a stressor, and "eustress" as a positive response to a stressor.

Theoretical Models of Stress

Medical model

McNamara (2000) conceptualized stress with three distinct models in the literature: the medical, environmental, and psychological models. The medical model emphasizes the physiological and biological response of a person's body when encountering a stressor (Cox & Griffith, 1995; Selye, 1956; Szabo et al., 2012). This relates to perspectives of the earliest studies conducted on stress which either considered stress as just being an illness or directly related to physical disease (Selye, 1936). This model disregards all other potential factors (e.g., psychological state, personal trait, environment) that builds the experience of stress. Especially, this model heavily relies on medical perspectives, therefore, views stress as a disease that negatively affect human health, and something to cure just as any other symptoms. As this is one of the earliest developed models, the medical model is rarely used in today's literature to study stress.

Environmental model

The environmental model views stress as an independent factor that arises from external (environmental) characteristics that induce stress (McNamara, 2000). The environmental model is widely recognized and often used in occupational stress research, a context where eustress has been studied relatively often. However, it is important to note that the environmental model itself may cause confusion on person's psychological evaluation/appraisal of stress (Cohen et al., 1995). This is because stressors place an environmental demand upon an individual, and one may evaluate the stressor based on personal resources (e.g., functional ability, social support) when interpreting such given demands. Therefore, one's experience of either eustress or distress may be based on whatever resources are available, rather than focusing one's psychological appraisal of the stressor. The environment model adds an important dimension to the process of stressors being interpreted as positive or negative by emphasizing the importance of environmental influences, but the model itself lacks on fully digesting the overall process of eustress and distress. While the environmental model advanced our understanding of stress beyond the medical model, the psychological model went a step further to provide more holistic understanding of the experience of stress.

Psychological model

Lastly, the psychological model of stress conceptualizes stress as an interactive relationship between a person's cognitive appraisal of the stressor and the given stressor (Lazarus & Folkman, 1984). The theory of cognitive appraisal, or the psychological model, is the conceptualization of stress most relevant to this study (Lazarus & Folkman, 1984). According to this model, responses to stress entail primary and secondary appraisals of the stressor. The primary appraisal determines whether the stressor is worth facing, and the secondary appraisal

requires individuals to determine the amount of resources this stressor requires, and if they possess the resources to handle the stressor. According to Le Fevre, Kolt, and Matheny (2006), how a person views stress can be influenced by not simply the amount of demands from the stressor, but also by characteristics such as “its source, timing, the degree to which they have control over it, and the degree to which they consider it desirable” (p. 551). This secondary appraisal is when a person interprets a stressor as challenging or threatening. Eustress occurs when a person determines he/she possess adequate resources to handle the stressor and takes it as challenge one is willing to face. On the other hand, distress is when a person determines the demand of the stressor exceeds his/her resources, so it appears more as a threat than a challenge. Determining the balance between an individual’s resources and demands by the stressor is the key component of the psychological model and then stress is channeled negatively or positively. Therefore, the combination of the environmental and psychological models account for the entire process of understanding eustress and distress. Although this dissertation aims to look at both eustress and distress in the context of leisure, closer examination of the concept eustress is necessary. This is due to the limited understanding and familiarity of eustress from lack of empirical evidence in the existing literature.

Conceptualizing Eustress

Nelson and Simmons (2011) defined eustress as a “positive psychological response to a stressor, as indicated by the presence of positive psychological state” (p. 59). Other scholars agree that eustress is more than just the absence of distress, rather it encompasses positive states, attitudes, and emotions such as positive affect, meaningfulness, and satisfaction (Zohar, Tzischinski & Epstein, 2003; Parker & Ragsdale, 2015). It has been claimed that eustress might help to increase self-efficacy, replenish energy, and improve cognitive processing, which can

also help revitalize other resources such as thought-action repertoires (e.g., pleasant interaction with someone become a supportive friendship), enable creativity (e.g., trying new ways to reach a work goal), and foster flexibility (Gross et al., 2011). For example, Hargrove, Nelson, and Cooper (2013) found support for the relationship between eustress and good health, well-being, and positive job performance. Also, eustress has been indicated to be a predictor of life satisfaction followed by hope and self-efficacy among undergraduate students (O'Sullivan, 2011). Even though eustress may seem straightforward and clear enough to be associated with many positive factors of human conditions, eustress has many intricacies that justify further research to understand how and when it is activated, and its relationship to health and well-being.

One fundamental similarity in the literature is that distress and eustress are distinct constructs and they do not exist at opposite ends of a spectrum (Le Fevre et al., 2006; Nelson & Simmons, 2011). This means that distress and eustress can happen simultaneously and changes in the amount of either distress or eustress does not automatically decrease or increase the other construct. Nelson and Simmons (2011) contributed theoretical and empirical knowledge related to the construct of eustress advocating for a holistic view of stress that supports the notion that a person may respond to a stressor with both positive and negative reactions simultaneously. The authors examined the situation of getting a promotion at work as an example. A promotion could produce an experience of eustress for the individual if he/she is looking for the new position and finds it meaningful with an adequate amount of challenge. At the same time, it could also elicit distress if the individual is worried about new duties and meeting the expectations and standards of the new position. An example more relevant to older adults could be going to the doctor or managing chronic conditions. Older adults may experience eustress about the progress they made coping with their chronic conditions, but they may feel distress about the pain or demands (e.g.,

rigorous physical therapy needed, surgery needed) required by the physician. There is a dearth of research that explains how individuals perceive one state as more dominant than the other when both are present. However, it is important to acknowledge that eustress and distress, which are separate and distinct constructs, can both be present from the same incident (i.e., stressor).

Despite the potential benefits of eustress in the context of individuals' health, well-being, quality of life, and managing stress, eustress receives very little attention in the literature. As Mesler (1993) stated from summarizing the scope of the literature on eustress, there are no adequate models, and relatively few studies that examined the antecedents and qualities of eustress. A little over 20 years later, eustress still remains a largely theoretical concept instead of being applied in many relevant contexts. The most salient studies related to eustress are addressed in this literature review in order to combine similar views and point out the discrepancies between them. Next, how different theoretical backgrounds formed different approaches to defining eustress will be examined to inform the conceptualization of eustress and its potential association in this study.

Theoretical Background of Understanding Eustress

The concept of eustress originated and was defined from two different approaches. In the earlier years, more emphasis was given to the first perspective which was to focus on the “amount” of stress and demand upon an individual. Yerkes-Dodson's law (Yerkes & Dodson, 1908), optimal arousal theory (Hull, 1943), and flow theory (Csikszentmihalyi, 1975) are the backbones of understanding eustress and distress from this perspective. However, more recent literature claims that the “interpretation/appraisal” of the given stressor is the key component to constructing eustress. This approach of interpreting a stressor as the key construct of

understanding eustress has gained theoretical evidence from the challenge stressor-hindrance stressor framework (Lepine et al., 2005), control theory of occupational stress (Spector, 1998), and holistic stress model (Nelson & Simmons, 2003). While literature is not yet advanced enough to clearly and certainly state how the combination of the two approaches (i.e., amount and interpretation) promote eustress and distress, it is important to look into the theoretical backgrounds of each viewpoint. Also, how these theoretical backgrounds can possibly be connected or pose some new insights to the concept of eustress for this dissertation study are discussed.

Optimal arousal theory (Yerkes-Dodson's law)

As optimal arousal is defined as a psychological construct which refers to a level of mental stimulation at which physical performance and feelings of well-being are maximized (Smith, 1990), optimal arousal theory, often referred to as the arousal theory of motivation, is an internal motivation theory claiming that people generally strive for an optimal level of arousal (Hull, 1943). Motivation is believed to be at its peak and most effective when a person experiences the optimal level of arousal. What is optimal varies from person to person and from situation to situation. Ideally, though, people are generally motivated when they perform tasks or engage in activities that provide them with an appropriate challenge to their abilities and are neither too difficult nor too easy.

The Yerkes-Dodson law delivers a starting point for understanding the arousal-behavior relationship. According to this law, there is an inverted-U relationship between performance and arousal; that is, as arousal increases, performance advances up to some point at which performance is maximized. After that, increases in arousal lead to decreases in performance (Hebb, 1955). Thus, the peak of the inverted U is also the point of diminishing marginal returns.

As seen in figure 1, this common inverted U-shaped graph we know is in fact Hebb's (1955) version of the Yerkes-Dodson law. The original version (figure 2) by Yerkes and Dodson (1908) divides tasks into simple and difficult, because strong emotionality could improve performance if the given task was simple, whereas diminished performance is possible when faced with a difficult task due to strong anxiety. Although distinguishing two different versions of Yerkes-Dodson law is not important nor directly relevant to the point, it is worthwhile to clarify how the two versions are different and that what everyone used as Yerkes-Dodson law graph was actually Hebb's (1955) version which had been misrepresented for the past 50 years (Diamond, et al., 2007).

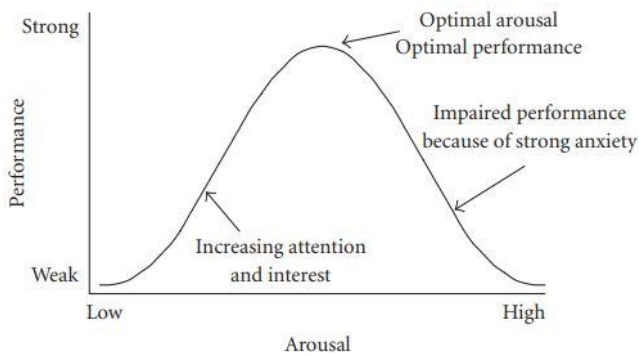


Figure 1. Hebb's (1955) version of Yerkes-Dodson law

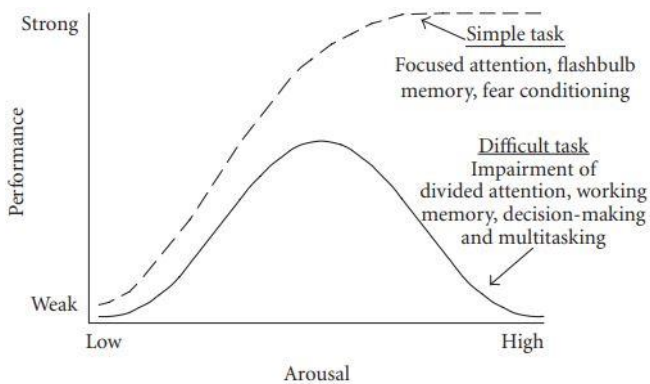


Figure 2. Original version of Yerkes-Dodson law (Yerkes & Dodson, 1908)

Two psychologists Yerkes and Dodson (1908) came up with this law after an experiment of increasing arousal levels on rats during maze completion. They discovered that a mild electric shock was associated with increased maze performance, whereas a very strong electric shock was associated with decreased performance level. Although, the relationship between the level of electric shock and performance varied by the tasks, the main result numerous scholars inferred from this law was the inverted U-shaped relationship between the arousal level and performance (Hebb, 1955; Revelle & Loftus, 1992; Eysenck, 2012). The electric shocks used to control arousal levels of test mice is also a form of stressor or demand, therefore it was naturally applied in the context of stress. The application of Yerkes-Dodson law suggests that an optimal amount of stress can increase an individual's performance, which some interpret as eustress. The notion of optimum stress or optimal levels of stress started to appear in the field of occupational stress as productivity is one of the key interests.

As evident from past literature (Kung & Chan, 2014; Le Fevre et al., 2006) the concept of eustress has gained attention from management perspectives in occupational settings. Occupational stress represents a potential loss of talent for organizations causing monetary loss, yet it seems inevitable in the competitive society we live in (Cartwright, 2000). Therefore, rather than minimizing the level of stress in the workplace, practical advice has been to manage stress to optimal levels for better performance. Through applications of Yerkes-Dodson Law and Hebb's (1955) version of the interpretation, common management practice assumes that a reasonable amount of pressure, anxiety, or fear in the environment (i.e., reasonable amount of stress) leads to higher performance (Benson & Allen, 1980; Certo, 2015; Lussier, 2010). The application of this lesson encourages managers to attempt to maintain stress at optimal levels for performance rather than endeavoring to minimize stress. This interpretation of eustress with the

application of Yerkes-Dodson Law represents only one aspect of the eustress construct (i.e., optimal amount) and excludes personal interpretation of the given stressor or environment. In Selye's work, optimal amount approach is an implicit rather than explicit aspect of what he defines as eustress (Selye, 1987). Clarifying the application taken from the idea of the optimal amount of stress, Selye (1987) explicitly maintained that the distressful or eustressful nature of any particular stimulus is governed by how one interprets it and chooses to react to it. Therefore, eustress should be focused on the perception of the demand (i.e., stressor) given to the individual rather than only the amount of demand, whether it's too high or too low. The approach of optimal amount stress as a key aspect of eustress had been used in occupational settings because stress is inevitable in the workplace, while individual's level of performance remains the most important aspect. Therefore, Yerkes-Dodson Law was implemented to suggest that optimal amount of stress provides increased performance, therefore stress is not all bad. This perspective of understanding eustress is very liminal which does not fully describe the nature of eustress on human experience.

Flow theory

Csikszentmihalyi (1975) first developed the concept of flow which he defined it as a state of mind that amounts to absolute absorption in an activity which results in an experience that reflects a genuinely satisfying state of consciousness (Csikszentmihalyi et al., 1990). Thus, they considered the state of flow as an optimal experience: a time when people feel deep concentration and enjoyment. Optimal arousal theory and flow theory share similar justification that 'optimal amount' is the key. For the case of flow theory, the balance between a person's skills and abilities, and the task difficulty is one of the core determinants to experiencing flow (Csikszentmihalyi & Csikszentmihalyi, 1988). Therefore, a balance between the challenge

compared to one's ability, not too difficult (results in anxiety or frustration) or not too easy (results in boredom, loss of interest) relates to how the balance between the level of arousal and performance/motivation works in the optimal arousal theory. Flow theory can't be used to directly explain eustress, however its implication can pose interesting insights to understanding the concept.

As stated above, the core element of flow theory is the optimal balance between one's skills and the level of challenge. This means there needs to exist a particular challenge to experience flow; a person needs to either select the appropriate level of challenge that meets his/her skills or improve the level of skills to meet the difficulty of the given task. The term challenge could mean stressor, especially for older adults because a significant portion of their stressors are from daily challenges (e.g., bathing, preparing food, caregiver role) sometimes eclipsing the impact of major life events (Almeida, 2005). In the context of stress coping, literature is focused heavily on the stressor (i.e., challenge) itself on how to minimize and avoid the challenge (Paragment et al., 1998) instead of improving one's skill/ability to meet that challenge as suggested in flow theory. Therefore, when thinking about eustress, it is essential to consider the individual's ability to deal with a given stressor, which can help one have a more positive perception of the stressor. The term ability in this context could be understood in a variety of things such as physical and cognitive functioning, socioeconomic status, and access to different resources. The key takeaway is that we can promote eustress (i.e., help them have a more positive perception of stressor) by providing ways to help older adults increase their level of skill/abilities. This means that one can improve their frequency of experiencing eustress with training their adequate skills/abilities.

Challenge stressor-hindrance stressor framework

The aforementioned optimal arousal theory (Yerkes-Dodson law) and flow theory proposed there is an optimal level of stress necessary that parallels with an optimal level of performance. However, findings from more recent studies have not entirely supported this claim (Lienert & Baumler, 1994; Teigen, 1994; Westman & Eden, 1996). For example, the Challenge Stressor Hindrance Stressor Framework (CSHSF) adds an explanation to the inconsistent relationship between performance and stress (Lepine et al., 2005). The CSHSF differentiates the stressor into two categories: challenge stressor and hindrance stressor. Challenge stressors are conditions that are appraised as “having the potential to promote personal gain or growth, trigger positive emotions, and activate problem-solving style of coping” (p. 765), and hindrance stressors are the opposite which are appraised as “having the potential to harm personal growth or gain, trigger negative emotions, and activate a passive style of coping” (p. 765).

In their meta-analysis, Lepine, Podsakoff, and Lepine (2005) used expectancy theory to hypothesize that people are more motivated to deal with challenge stressors because they are likely to believe they possess the resources and desires to cope with the given demand. On the other hand, it was hypothesized that hindrance stressors are associated with low motivation. They found that there is a significant positive relationship between challenge stressors and motivation, and a significant negative relationship between hindrance stressors and motivation. This framework showed a different approach to understanding a person’s stress and level of performance compared to the previous theoretical backgrounds by acknowledging the importance of two different stressors interpreted as either positive or negative. Since eustress is a relatively understudied concept, related constructs such as challenge stressors from this

framework are helpful to better understand the phenomenon and its potential relationships with older adults in the context of leisure.

Control theory of occupational stress

The concept of control has served a pivotal role in many theories of job-related stress, as well as other areas of organizational research (Ganster & Fusilier, 1989). Control can be defined as the ability of a person to make choices between two or more alternatives (Ganster & Fusilier, 1989). Control in the workplace, for instance, may range from complete autonomy to some personal control over workload and schedule, to complete servitude. Additional alternative positions exist outside the above continuum where there is a certain degree of autonomy over some aspects of work, but only partial control over other areas. This is more realistic in many cases because people are engaged with various roles, situations, environments, and skills that shape how much control they maintain in their work (Le Fevre et al., 2003).

According to Spector (1998), the control theory of occupational stress is based on the idea that people's perceived degree of control over the stressor or any variables that have potential to cause stress in their environments affects likelihood they will experience stress. The original model of Spector's (1998) control theory includes locus of control and self-efficacy as moderating variables to perceived control which directly leads to a perceived stressor or the experience of stress itself. This model also allows a separate emotional response to the stressor which allows for the individual to experience the stress as eustress or distress. See figure 3 (Spector, 1998) for a diagram of this original model. While it is logical that locus of control and self-efficacy can influence stress, empirical support for this stance is weak (Dollard et al., 2000; Le Fevre et al., 2003) and a revised version of Spector's (1998) model was proposed by Le Fevre, Matheny, and Kolt in 2003 (see figure 4). Their model describes the process of how the

‘individual’ (i.e., characterized by perceptions of one’s efficacy, locus of control, and affective disposition) and the ‘stressor’ (an environmental stimulus characterized by the perceived source, timing, and desirability) combines to trigger the “perception of stressor” (i.e., the interface of environmental stimuli and the individuals’ way of interpreting). Then, the perception of stressors become the ‘experience of stress’ whether that is eustress or distress which leads to individual’s behavioral, physical, and psychological outcomes (Le Fevre et al., 2003). This model is derived from the original control theory by Spector (1998) and emphasizes the importance of individual’s role on how to perceive and react to a stressor. This is aligned with Selye’s (1987) original intentions to defining eustress and distress.

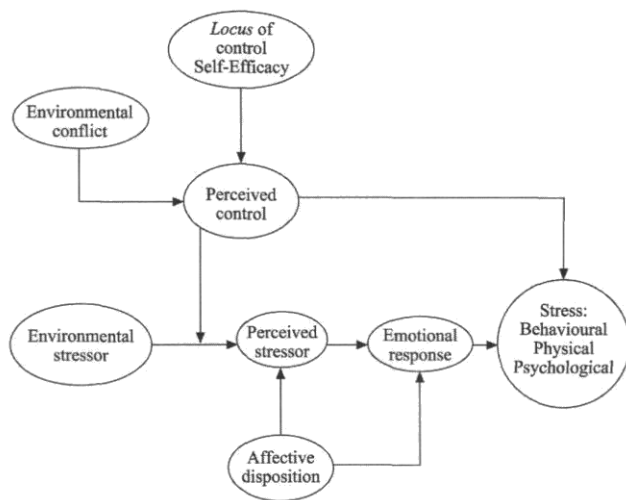


Figure 3. Original model of Control Theory (Spector, 1998)

The revised version of Spector’s model (Le Fevre et al., 2003) emphasizes the interface of environmental stimuli and an individual perception of those stimuli. The concept of control is included as one characteristic of the person, among many, that may impact his/her interpretation of stressors. Also, in this model, stressors are characterized by different properties beyond the amount. This more integrative model does not differentiate moderating and mediating variables;

instead, it suggests a reconsideration of what we know about stress providing a robust foundation of core elements. The fact that the revised version of Spector’s model simplified the empirically uncertain variables while maintaining the key aspects, helps to explain the process of eustress more concisely. This revised model derived from the control theory directly explains the process of eustress emphasizing the importance of “individual’s perception/interpretation” rather than “optimal amount.”

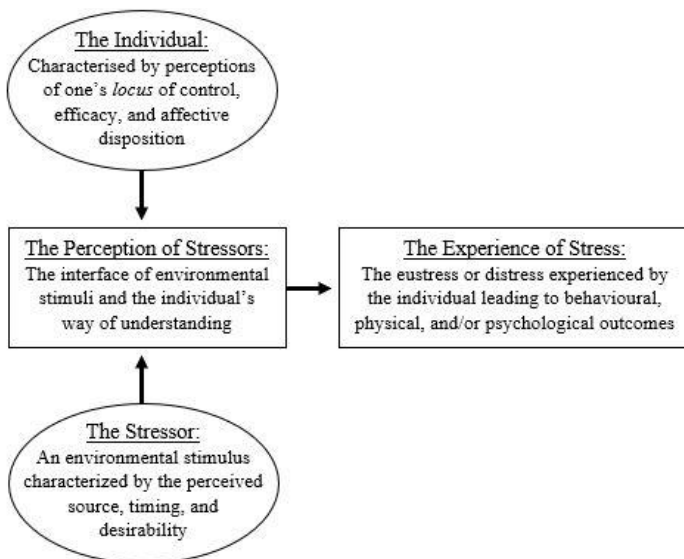


Figure 4. Revised version of Spector’s model (Le Fevre, Matheny, & Kolt, 2003)

Holistic stress model

Grounded in the field of positive organizational behavior, Nelson and Simmons developed and continuously updated a framework called the Holistic Model of Stress (Nelson & Simmons, 2003, 2011; Simmons & Nelson, 2007). The authors asserted that the best way to advance the study of eustress is by developing an inclusive theoretical model that integrates and broadens our knowledge on both positive and negative causes, consequences, and outcomes of stress, rather than only looking at one side (Simmons, 2000). Nelson and Simmons examined

eustress and distress as a result of cognitive appraisal of the given stressor which is aligned with the control theory of occupational stress (Le Fevre et al., 2003; Spector, 1998). Also, this model acknowledges the impact of different individual traits (e.g., self-esteem, locus of control, interdependence, hardiness, optimism/pessimism) and how that affects (i.e., moderates) the way in which stressors are appraised.

Something that is unique about the holistic stress model, however, is that this model assumes that stressors (demands) are inherently neutral, and it is the individual's cognitive appraisal of the given stressor that produces a simultaneous negative and positive response. This is different from the previous frameworks (Le Fevre et al., 2003; Spector, 1998) that also viewed eustress as an interpretation or appraisal of the stressor. Putting the stressors in a neutral position, this model strengthened the role and rationale for individuals' process of evaluating and making a cognitive appraisal as key determinants of the experiences of eustress and distress. Therefore, it is the response to stressors that have negative and/or positive aspects based on the degree of aversion and/or attraction the individual experiences toward the object or event (Simmons & Nelson, 2007). For instance, an upcoming exam can be a stressor for students. Although it may seem like the stressor itself would be associated with a negative response, it is viewed as neutral. A student who studied hard for an upcoming exam or who just likes taking tests, may experience the attraction from the stressor which may lead to eustress, whereas a student who is in the opposite realm would encounter aversion from the stressor that is likely to lead to distress. Degree of aversion and/or attraction varies by individuals, and the holistic model of stress provided five examples that could influence the individual differences (e.g., optimism, hardiness, locus of control, self-reliance, sense of coherence: Nelson & Simmons, 2011). Other important components of this model are the process of coping and savoring. Individuals select strategies to

either alleviate or eliminate their negative responses to stressors, or to potentially dampen or accentuate their positive responses (Simmons & Nelson, 2007). Therefore, when individuals experience distress then they tend to use coping strategies, whereas during the experience of eustress, they would savor the experience (Nelson & Simmons, 2011). The full diagram of this model is shown in figure 5.

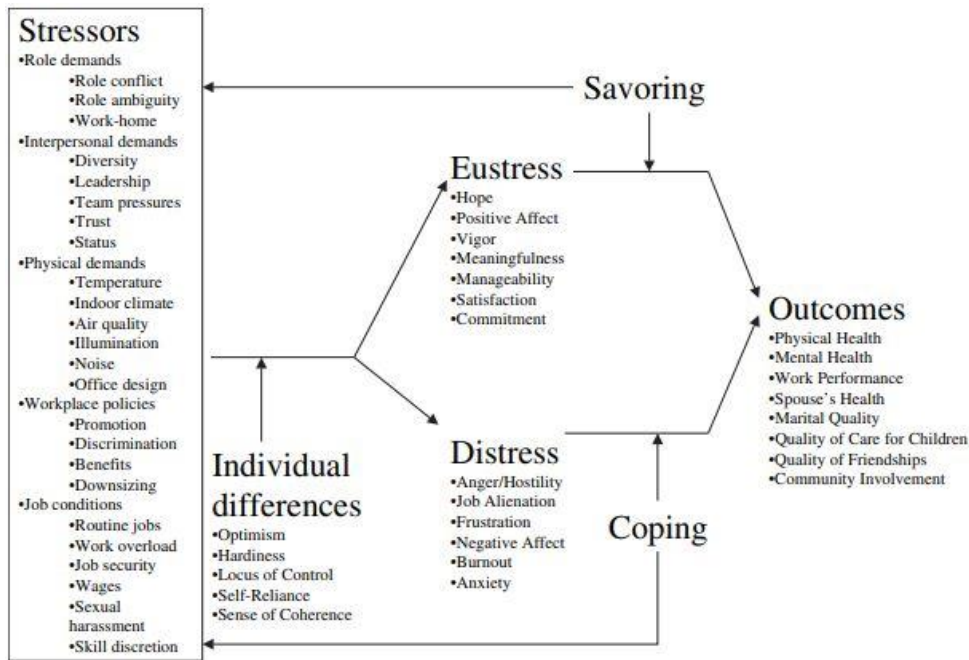


Figure 5. Holistic Model of Stress (Nelson & Simmons, 2011)

The holistic stress model has been examined in studies of university professors, hospital/home healthcare nurses, assisted living center employees, and pastors in regard to their work related stressors/demands (Gooty et al., 2005; Little et al., 2006; Nelson & Simmons, 2003, 2004; Simmons & Nelson, 2001, 2005; Simmons et al., 2001, 2003). Positive psychological states (e.g., hope, positive affect, meaningfulness) were used as indicators of eustress, and negative psychological states (e.g., anxiety, negative affect, anger) were used as indicators of distress. Hope, the belief that one will accomplish the goals in a work setting (Snyder et al.,

1996), was the most effective indicator of eustress, and level of satisfaction with work or supervision were significant predictors of hope in the work environment. Personal difference variables, especially interdependence, played a significant role in this model (Nelson et al., 1991). Originated from the attachment theory, interdependence is a secure and healthy attachment that enables individuals to work autonomously with peace of mind (Ainsworth & Bowlby, 1991; Bowlby, 1982). Hope also significantly mediated the positive relationship between nurses' level of interdependence and perception of health (Simmons et al., 2003).

Evolving from the concept of psychological states when considering eustress and distress, researchers have attempted to extend this model to include behavioral indicators of eustress (e.g., forgiveness, positive affect and engagement) and distress (e.g., revenge, negative affect and burnout: Little et al., 2006). Contrary to authors' expectations, there was no significant relationship between behaviors indicating eustress and participants' perceptions of health. However, it is something to consider for future studies because individuals' psychological states and following behaviors are deeply connected. Also, emotions may play a legitimate role in the holistic stress model as indicators of the responses from cognitive appraisals of stressors (Simmons & Nelson, 2007). Therefore, this model deepened the holistic understanding of how eustress and distress are appraised and how these experiences lead to individual outcomes such as older adults' healthy aging process, which is the main focus of this dissertation.

Measurements of Eustress

As previously mentioned, eustress is a relatively understudied concept and it was after beginning of the 21st century when the literature on measurement of eustress first started to appear. The existence of eustress measurement is limited in terms of its universality as well as its

reliability and validity in some cases. Measurement is the next step of systematically studying the experience of eustress and the focus of this dissertation is to develop a leisure-based eustress-distress scale. Therefore, it is important to look at existing measures of eustress. Both qualitative and quantitative approaches of measuring eustress are discussed.

Qualitative approach

Only three qualitative studies using interview and focus group methods have explored the concept of eustress among specific groups of people who experience high levels of stress (Branson et al., 2018; Gibbons et al., 2008; Oksman et al., 2016). Oksman and colleagues (2016) interviewed 21 entrepreneurs to learn how they balanced negative and positive stress. Findings suggested the presence of both distress and eustress in different situations. Some situations that triggered eustress for participants were challenging negotiations, presentations, and preparing a meeting for a potential client. However, participants reported that categorizing such events as either positive or negative was difficult, because both positive and negative stress related experiences or emotions frequently mixed and merge together. This study also attempted to measure physiological stress by assessing participants' heart rate to determine whether their bodies were in stress mode or recovery mode. As a result, no significant differences were found during stressful situations related to their heart rate among the participants, suggesting that individual's heart rate is not the best way to determine their levels of stress. This strengthened the claim that it was the individual's cognitive interpretation of the stressor that determined the experience of eustress or distress, rather than the physiological response (Oksman et al., 2016). A study by Gibbons and colleagues (2008) looked at nursing students' experiences of both eustress and distress. The sources of distress (i.e., overwhelming academic demands) concurred with previous literature, however nursing students were able to experience eustress from the

experiential learning and patient care opportunities (Gibbons et al., 2008). Lastly, a study by Branson and colleagues (2018) examined adolescents' experiences of eustress and distress in which they found the six key dimensions that differentiate the two stresses among adolescents: state of mind, perceived efficacy, function, affect, connection, and constitution. Both studies (Branson et al., 2018; Gibbons et al., 2008) were conducted as part of the initial stage (i.e., item generation) of a scale development study, which is reviewed in more detail below. These three studies illustrated that the concept of eustress can exist along with the distress, and it is determined by how individuals appraise the stressor.

Quantitative approach

There have been some attempts to measure eustress quantitatively mostly comprised of self-report measures (Branson et al., 2019; Gibbons et al., 2009; O'Sullivan, 2011; Rodriguez et al., 2013; Simmons, 2001). This scale development has taken two approaches: direct and indirect measurement of eustress. There are studies that have attempted to indirectly measure and conceptualize eustress as the presence of positive psychology states (Little et al., 2007; Nelson & Simmons, 2011; Simmons, 2001; Simmons & Nelson, 2001), however that literature has already been mentioned under the holistic stress model, therefore only the direct measures of eustress using quantitative approach were analyzed.

Direct measurement of eustress. To date, there are four direct measurement scales of eustress (Branson et al., 2019; Gibbons, 2009; O'Sullivan, 2011; Rodriguez et al., 2013), and each of them is summarized in Table 1 and reviewed below.

As nursing is a very high demanded job, much research exists that has examined the negative experiences of stress in this profession. However, only limited attempts have been made

to explore the concept of eustress, therefore Gibbons et al. (2009) examined the stressors that led to either eustress and/or distress using the Index of Sources of Stress in Nursing Students (ISSN). Generated from focus groups that explored stress among nursing students (Gibbons et al., 2008), the ISSN consists of 29 items. Since authors targeted nursing students' experience of eustress and/or distress instead of the nurses working in fields, a big portion of the generated items were related to academic factors. Each of the stressors (i.e., items) were rated twice by the participants with 6-point Likert scale (i.e., 0 = no source of stress to 5 = a major source of stress), once on a distress scale where the stressor was viewed as a hassle and another on a eustress scale where the stressor was viewed as an uplift. Some examples of items include "lecturers who enforce discipline", "patient relationship", "variation in tutor styles." Total of 176 senior nursing students from a university in Ireland participated in the study. A three-factor model (i.e., placement related, learning and teaching, and course organization) were identified from a confirmatory factor analysis with adequate fit for uplift rated stressors $\chi^2=451.77$ with 342 d.f.; RMSEA=.042, and hassle rated stressors $\chi^2=728.03$ with 367 d.f. RMSEA=.076. Authors followed Tabachnik and Fidell's (2007) suggestion that a good fit for a model can be indicated when twice the degrees of freedom is higher than the chi-squared value. Also, when the root mean square error of approximation (RMSEA) is between 0 and .06, the model is considered as a good fit and a poor fit is indicated when the score is higher than .1 (Browne & Cudeck, 1993). Therefore, Gibbons and colleagues (2009) claimed that the proposed scale of ISSN showed good model fit. The scale items are specifically worded for the nursing students, so this limits the use of this measure in other populations.

The next study (O'Sullivan, 2011) only looked into the measure of eustress. Although this study examined the relationships among hope, eustress, and life satisfaction among college

students, only the eustress part is mentioned in this paper. O'Sullivan (2011) suggested that an individual's interpretations of stressors is the best way to capture one's experience of eustress, therefore would also be the most accurate measure of eustress. O'Sullivan developed a eustress scale that consisted of 15 items, five of which were filler questions. The ten items asked about whether an individual interpreted an academic stressor as a challenge rather than a threat, and whether this interpretation led them to be more motivated or engaged. All questions were asked in 6-point Likert scale: "*Never, Almost Never, Sometimes, Often, Very Often, and Always*" with higher scores indicating higher levels of eustress. A total of 118 college students participated in this study with 30 students who took the survey twice after 2 weeks for the test-retest validation. The internal consistency of the 10 items on eustress produced a Cronbach's alpha coefficient of .766 for the initial survey, and .806 for the second survey with no significant differences found between the two administration ($t = -.418, p = .679$). According to the data, this eustress scale can reliably measure eustress for a student population. However, the scale still needs to provide evidence of its internal structure reliability and validity.

The Valencia Eustress-Distress Appraisal Scale (VEDAS) was created by Rodriguez and colleagues in 2013 and tested it for public social workers in Spain. Authors drew 40 initial self-report item measures from the Pressure Management Indicator (PMI; Williams & Cooper, 1998). Of those 40 items, six items only assumed a distress experience (excluding the eustress experience), and therefore they were deleted. The remaining 34 items were measured on a 6-point Likert scale among the 603 participants who ranged in age from 20-70 years old. Eustress was asked from 1 being *very definitely is NOT a source of opportunity/challenge* to 6 being *very definitely IS a source of opportunity/challenge*, and distress from 1 being *very definitely is NOT a source of pressure* to 6 being *very definitely IS a source of pressure* (Rodriguez et al., 2013).

Eight items were removed after the item-item correlations, so the exploratory factor analysis was conducted with the remaining 26 items, which were divided into four factors: Relationships, Workload, Personal Accountability, and Home-Work Balance. A follow-up study was conducted to examine the VEDAS's validity and reliability over a 6-months period. In this second study, 431 people returned from the first study to participate and they completed the VEDAS for the second time as well as questionnaires on burnout, satisfaction, work engagement and general psychological health. As a result, VEDAS had a good internal consistency reliability with $\alpha=.89$ for eustress and $\alpha=.91$ for distress. Test-retest reliability of the four factors was supported with moderate stability (eustress and distress: $p<.01$). Also, it was confirmed through a confirmatory factor analyses that the four-factor model (eustress: RMSEA=.07, CFI=.97; distress: RMSEA=.067, CFI=.98) had a significantly better fit than the one factor model (eustress: RMSEA=.10, CFI=.92; distress: RMSEA=.10, CFI=.95) for both eustress and distress. In terms of validity, eustress was positively correlated with work engagement ($r=.15$), and negatively with burnout ($r= -.12$). Distress was positively correlated with burnout ($r=.20$), and negatively correlated with general psychological health ($r= -.62$) and satisfaction ($r= -.26$). Overall, this study followed robust steps in developing the scale, which is more generically designed than the ISSN, and suggests that with appropriate psychometric properties, eustress and distress can be measured through a self-report questionnaire.

The last and most recent study was conducted by Branson and colleagues (2019) in which they developed the Adolescent Distress-Eustress Scale (ADES). In alignment with previous works like the Transactional Approach (see Lazarus & Folkman, 1984) and Holistic Model of Stress (Nelson & Simmons, 2003), the authors regarded the experience of eustress and distress as an individual's appraisal of the given stressor (Branson et al., 2019). The ADES was developed

following the scale development guideline suggested by DeVellis (2012). The initial study for item generation and refinement consisted of interviewing 20 adolescents. From the interviews, 463 items were generated which were narrowed down to 50 items (25 items per each subscale: eustress and distress) after the process of doing cognitive interviews with 12 adolescents and going through an expert review process (i.e., experts' feedback, clarity, developmental appropriateness). Two more items were eliminated before the exploratory factor analysis due to them being strongly negatively skewed. The second portion of the study consisted of 981 participants which was randomly divided into two subsamples (i.e., development subsample: exploratory factor analysis; n=491 and cross-checking subsample: confirmatory factor analysis; n=490). Also, all individuals recruited from the University were asked the ADES twice after one week to assess the test-retest reliability of the scale (n=83). As a result, from the exploratory factor analysis, 10 items were confirmed with a two-factor structure. It showed a weak correlation between the factors ($r = -.32$), which suggests that subscales to serve as independent dimensions (i.e., ADES-E: eustress and ADES-D: distress). As a result, ADES was finalized with two correlated subscales of eustress and distress, and each consisted of 5 items. Both subscales had a good reliability in terms of internal consistency with ADES-E having $\alpha = .83$ and ADES-D with $\alpha = .87$. The test-retest reliability was strong for eustress scale, $r = .81$, $p < .01$ and distress scale, $r = .86$, $p < .01$ indicating a good stability of the ADES scores. Regarding its validity, a strong positive relationship was found between the ADES-E and Academic Eustress Scale, $r = .60$, $p < .001$, and between the ADES-D and the Perceived Stress Scale, $r = .68$, $p < .001$. These results provided evidence for the convergent validity of the ADES. Along with rest of the scales that were analyzed in this paper, ADES also served as a bridge to connect the gap between an actual measurement and theory.

Table 1. Direct Measurement of Eustress (Self-report)

Author(s)	Scale	Number of Items	Response Scale	Study Sample
Gibbons et al. (2009)	Index of Sources of Stress in Nursing Students (ISSN)	29	6-point Likert Scale	Nursing Students
O’Sullivan (2011)	Eustress Scale (ES)	15 (10 content items, 5 filler items)	6-point Likert Scale	College Students
Rodriguez et al. (2013)	Valencia Eustress-Distress Appraisal Scale (VEDAS)	34	6-point Likert Scale	Public Social Service Professionals
Branson et al. (2019)	Adolescent Distress-Eustress Scale (ADES)	10	5-point Likert Scale	Adolescent

Now that the concept of stress, especially eustress, has been carefully conceptualized and analyzed with its theoretical backgrounds and existing measurements, it is time to narrow down the scope to connect the concept of eustress and distress with more specific contexts of this dissertation. Therefore, stress (i.e., encompassing both eustress and distress) and its interconnectedness with leisure and how stress can specifically be understood or applied among older adult populations will be further examined.

Leisure Based Eustress and Distress among Older Adults

Since the goal of this research is to develop a leisure based eustress-distress scale, it is important to look at some of the constructs that may be related. The experience of leisure based

eustress and distress likely comes from an individual's interpretation of the given stressor, therefore having better insights into the possible leisure related stressors and characteristics of the population is needed. This section addresses the relationship between stress and leisure, and also some possible factors for leisure based stressors.

Older adults and stress

Although people experience differential stress in various settings and environments (e.g., occupational stress), daily stress also accounts for a significant portion of people's lives. Especially among the older adult population who are mostly retired, a majority of their stress can come from their daily activities (McHugh & Lawlor, 2013). While continuous daily stressors account for increased levels of anxiety and potentially triggers depression among older adults (Vasunilashorn et al., 2013), stress can also make older adults feel a difference cognitively from the biological reaction in the brain. When a person becomes stressed, the brain gets flooded with stress hormones making the midbrain take over the front of the brain which limits the functional ability that controls concentration, attention, and decision making (Lupien et al., 2007; McGaugh & Roozendall, 2002). Although restorative sleep can help to flush the stress hormones from the brain, older adults often have sleep problems or chronic stress can make it more difficult to fall back asleep (Mowery et al., 2009).

In addition, the prevalence of chronic health condition(s) is very high among older adults, which can interfere with their quality of life and healthy aging process (Boult et al., 2009; Payne et al., 2010). While chronic condition(s) certainly make the older adult population more vulnerable to the negative impacts of stress, chronic health conditions are themselves a significant stressor among older adults (Miller et al., 2011). Also, ongoing health conditions may interfere with older adults' coping or managing stress because having one or more chronic

conditions limit their functional abilities (e.g., being able to drive, engage in ADLs) and may possibly disconnect them from coping resources (e.g., social support, leisure participation). In summary, stress can be a significant threat specifically for older adults' physical and mental health and disconnect them from healthy aging. Therefore, managing stress levels is critical to maintaining well-being and optimizing the quality of life especially for the older adult population.

Leisure and stress among older adults

From one of the earliest studies that looked at the relationship between stress and leisure (Coleman & Iso-Ahola, 1993), years of research in the field of leisure studies indicates that engaging in leisure activities helps to directly manage stress or has indirect impact by assisting older adults to better manage chronic conditions which are heavily interrelated with their stress. First, engaging in various forms of leisure activities have been found to be adaptive in the lives of older adults (Dupuis & Smale, 1995; Hutchinson et al., 2008; Orsega-Smith et al., 2004). For instance, participating in regular crafts and hobbies, swimming, and visiting friends were all associated with lower levels of depression and higher psychological well-being for older adults (Dupuis & Smale, 1995). Older women from Hutchinson and colleagues' study (2008) indicated that by participating in a social group called the "Red Hat Society," they were able to better manage daily stress. Also, visiting and the amount of time spent at the park as part of their leisure engagement was significantly associated with older adults' levels of stress and their physiological health (Orsega-Smith et al., 2004). Various forms of leisure engagement were evident to decrease the level of stress among older adults and assist them to better manage their ongoing stressors.

Participating in leisure activities may enable older adults with chronic conditions to remain physically, socially, and mentally active and allow them to express their remaining strengths and enduring interests (Hutchinson & Nimrod, 2012). It also provides opportunities for older adults to maintain or improve their physical and mental health. For instance, physically active leisure has been associated with enhanced independence, longevity, and improved cognitive and physical functioning for older adults with chronic conditions (Lampinen et al., 2006; Orsega-Smith et al., 2007). Also, leisure engagement may serve as a positive distraction from their ongoing health conditions, thereby improving the affect and fostering hope (e.g., Hutchinson et al., 2003, 2008; Son et al., 2007). As seen above, leisure plays an important role in managing and coping with stress in general among older adults. However, the term stress was used to only encompass distress, and all studies were about managing and/or coping with negative aspects of stress by engaging in different leisure activities. Therefore, next section will discuss different constructs that arise from engaging in leisure activities which helps individual to experience eustress especially among older population.

Constructs Associated with Leisure and Eustress among Older Adults

Although no existing studies have explored the experience of eustress among older adults in the context of leisure, there are many constructs derived from leisure engagement that are positively related to an individual's perception to appraise given stressors as eustress. As indicated in the previous models of eustress/distress (Le Fevre et al., 2003; Nelson & Simmons, 2003; Spector, 1998), the experience of stress is determined by how an individual perceives the given stressor. Therefore, individual differences/traits play an important role in deciding whether they would experience eustress or distress. Such differences among individuals are shaped by

presence or absence of different constructs and leisure engagement can enhance some of those constructs to assist older adults better experience eustress.

Firstly, individual's characteristics such as locus of control and self-efficacy have positive relationships with leisure engagement among older adults. These two variables are listed in the Original model of control theory (Spector, 1998) and the revised version of Spector's model (Le Fevre et al., 2003) as part of the constructs that affect individual when perceiving a given stressor. Therefore, individual's level of perceived control (i.e., perceived ability to influence events in one's environment), locus of control (i.e., internal vs external), and self-efficacy can affect his/her perception of a stressor either as eustress or distress. In terms of locus of control, internal locus of control which is characterized by the belief that outcomes are contingent on relatively stable personal characteristics, was positively related to exercising and participation in leisure activities among older adults (Menec & Chipperfield, 1997). Self-efficacy which can be defined as the belief in one's ability to perform a specific task despite obstacles and aversive experiences (Bandura, 1977) has been widely studied in the context of leisure (Duncan & Mummery, 2005; McAuley et al., 2003; Peterson et al., 2008). Even for older adults, self-efficacy was found to be significantly related to leisure engagement (De Bourdeaudhuij & Sallis, 2002; Orsega-Smith et al., 2007). As these characteristics of leisure that were directly mentioned in the existing models of eustress/distress influence individual's perception of stressors to either experience eustress or distress, more constructs derived from leisure participation are mentioned in the following paragraphs to explain how leisure engagement may be correlated with eustress among older adults.

Earlier studies (Dupuis & Smale, 1995; Kleiber et al., 2002) have posited that leisure plays a role in preserving or restoring older adults' sense of self and purpose of life. A recent

study also indicated that frequent participation in hobbies and leisure activities (i.e., physical, indoor, and religious) were the most significant predictors of having greater purpose in life among the older adults with cancer (Chun et al., 2015). This increased sense of purpose among older adults contributes to higher subjective well-being and adds meaning to their daily life (Dupuis & Alzheimer, 2008; Kelly, 1993). Also, regaining meaning in life offers important benefits in coping with and managing chronic conditions over the long-term period (McQuoid, 2017). As ongoing chronic condition(s) are important aspects of older adult's life and one of the major stressors, older adults' sense of purpose and perceived meaning of their life gained from leisure engagement are important facilitators to help them experience eustress. Another study found that leisure helped to build strength and resilience for older adults as their stress survival strategy (Iwasaki et al., 2005). According to Iwasaki and colleagues (2005) engaging in leisure acted as a positive diversion from stressful situations and thoughts, and served as personal renewal (psychological, physical, emotional) and rejuvenation. Not just as a coping strategy, leisure can help older adults gain personal renewal and rejuvenation which in the long run can assist older adults to perceive stressors as eustress instead of distress.

Two other characteristics of leisure that were studied with stress coping in general and potentially positive aspect of stress were leisure self-determination and leisure social support (Chang, 2015; Chang & Yu, 2013; Craike & Coleman, 2005; Sasidharan et al., 2006). Leisure social support was significantly negatively associated with health-related stress among older adults (Chang & Yu, 2013), and the support that older adults receive from family and friends to participate in leisure activities had positive effects on their perception of wellbeing, which included level of stress (Sasidharan et al., 2006). Also, participating in leisure activities allows older adults to build social connections and networks which shapes important boundaries for

emotional and psychological support (Broughton et al., 2017; Toepoel, 2013). A study by Toepoel (2013) showed that leisure activities (e.g., voluntary work, sports, cultural activities, shopping) explain a significant part of older adults' social connectedness as the social profile confirms that they have fewer social contacts and often feel lonely. Along with leisure social support, leisure self-determination was also negatively correlated with acute stress among older adults residing in nursing homes (Chang, 2015), and it was also found to buffer the connection between life stress and depression (Craike & Coleman, 2005). Therefore, fostering self-determination and social support through participating in leisure activities helped older adults better manage their stress and possibly experience eustress instead of distress.

Understanding Eustress from an Aging Theoretical Background: Selective Optimization with Compensation (SOC) Framework

The selective, optimization with compensation (SOC) framework provides a general understanding of developmental change and resilience across the lifespan which has been widely used as a self-regulation strategy among older adults (Baltes, 1997). It builds on the assumption that through the entire lifespan, people encounter some opportunity structures (e.g., education, training) as well as limitations in resources (e.g., chronic conditions) that can be mastered adaptively by an orchestration of selection, optimization, and compensation (Freund & Baltes, 1998). This model is used a lot for research on older adult populations, and according to the SOC framework, healthy aging/successful aging can be defined as minimizing negative (undesired) outcomes while maximizing positive (desired) outcomes. This process of adopting a goal-oriented self-regulation strategy to deal with functional declines among older adults is common and effective (Janke et al., 2015; Son & Janke, 2015; Son et al., 2009).

In the context of individual adaptation, selection pertains to the “identification, prioritization, and commitment to goals” in which the goal selection may be either “elective based or loss-based” (Son et al., 2009, p. 309). Elective selection refers to developing, choosing, and committing oneself to goals or preferred behavioral outcomes while the loss-based selection is an alternative decision from or toward a goal due to limitations that emerge (Freund & Baltes, 1998). Optimization is the effort to maximize selection by using internal and external resources as a means of attaining higher levels of functioning in selected domains (goals) (Baltes & Carstensen, 1996). An example of optimization is maximizing every effort to achieve the desired goal until the goal is met (e.g., playing golf for shorter periods of time wearing a back-support brace). Finally, compensation is finding and using alternative means to maintain functioning in the face of anticipated or experienced limitations (Hutchinson & Warner, 2014). SOC strategies allow older adults to adapt to changes (e.g., decrease in health, loss of family) and make decisions (e.g., participating in different activities) which enable them to continue to participate in their daily valued activities.

The purpose of the SOC framework is to help people achieve desired outcomes by setting goals that are attainable and meaningful in a limited situation (i.e., challenges acting as a barrier to meet the goal; Baltes & Baltes, 1990). Since older adults often face declines in their physiological and cognitive abilities due to normal and pathological aging and chronic conditions, they use this strategy to cope with functional declines. Those challenges tend to be one of their biggest stressors, and therefore SOC model can serve as a framework that assists older adults to manage stressors and even promote eustress. Often, older adults are not aware of the alternative opportunities that can still fulfill some of their goals because their physical or cognitive declines may seem like the end of everything. SOC framework can facilitate eustress

because it is guiding older adults to find different options to still satisfy the goal. This can promote a sense of control, hope, resilience, increased self-esteem and self-efficacy which are all prominently related to positive emotion (Diener & Diener, 2009; O'Sullivan, 2011; Schunk, 1990). Selye (1987) suggested that learning to react to stressors with positive emotions is likely to maximize eustress and minimize distress. Therefore, the SOC model can be used to help older adults achieve a better perception of the challenges. It may not immediately impact their perception to the challenge (stressor) in the first time. However, their experience of finding alternatives that helped them to attain a certain goal can boost their confidence to have more positive perceptions to the stressors they encounter in the future.

The findings from my master's thesis also confirmed the positive relationship between SOC model and eustress. A majority of the older adults in that study reported involuntary selection (loss-based) in the context of leisure engagement due to chronic conditions and lack of resources (e.g., not being able to drive, lack of program). However, older adults who successfully utilized SOC strategies were able to overcome the challenges and were able to alter their leisure activities. In fact, these older adults mentioned how they were able to approach those challenges positively instead of seeing them as a threat, which is an essential aspect of eustress (Le Fevre, Matheny, & Kolt, 2003). Older adults who utilized SOC strategies to better engage in leisure activities experienced leisure-oriented eustress which led them to have more leisure satisfaction, increased sense of control and perseverance, and a positive attitude. Those four themes promoted them to experience eustress even outside the leisure context which eventually led to their experience of the healthy aging process.

Summary of the Literature

Although the concept of eustress has been around for decades, it has still received little attention in the literature. As a result, no consensus exists for its universal definition as well as relatively vague and limited scopes of measurements. Minimal attempts have been made to develop a reliable and valid scale for measuring eustress. Eustress was studied in relation to some positive psychological and physiological outcomes mostly in the fields of management and occupational settings. Despite the anticipated association of the outcomes of eustress among older adults as well as the leisure engagement, no studies have yet been conducted. Also, no studies (neither qualitative nor quantitative) have yet attempted to measure the concept of eustress among older adults.

While there can be a debate about whether eustress results from the “optimal amount/level” of stress or “interpretation/appraisal” of stress, this study undertakes the psychological model of stress (also the control theory of occupational stress and holistic stress model). Therefore, eustress or distress which can be experienced simultaneously is determined by the individual’s interpretation and response to the given stressor. Also, individual characteristics and traits such as locus of control, affective disposition, self-efficacy, hardiness, optimism/pessimism, and interdependence will affect the interpretation process therefore provide different perceptions about the stressor between people. With this consensus on individual with different traits interpreting the stressor whether as more of eustress or distress, this study investigated the experience of both eustress and distress among older adults in order to develop a valid and reliable leisure based eustress-distress scale.

CHAPTER 3: METHODS

The ultimate goal of this dissertation was to contribute to an understanding of how older adults perceive and experience leisure-based stressors by developing a scale to measure both eustress and distress. More specifically, the purpose of this study was to develop a reliable and valid measurement of “leisure based eustress-distress.” The derived instrument will be referred to as the Leisure Eustress-Distress Scale (LEDS).

This chapter outlines the methodology for developing the LEDS. The methodology for this dissertation closely followed the widely accepted criteria of scale development outlined by DeVellis (2017) and a guideline suggested by Hinkin, Tracey, and Enz (1997). As outlined by DeVellis (2017), seven steps were followed to: (a) determine the construct components to be measured, (b) generate an item pool, (c) determine the format of measurement, (d) panel of experts review of the pool of items, (e) including instruments for validation check, (f) administering items to a development sample and evaluating items, and (g) optimizing scale length. This dissertation is divided into two phases. Phase 1 is item development, which consisted of generating items from a thorough literature review and in-depth interviews. In phase 2, the LEDS was constructed by administering and evaluating items to older adults for item-item correlation, factor analysis (both exploratory factor analysis: EFA and confirmatory factor analysis: CFA), and internal consistency assessment. Initial validation was examined with face validity, content validity, construct validity, and criterion validity.

Construct Components to be Measured

The process of deciding what should be measured by an instrument should be guided by theory in order to optimize instrument validity and reliability and to increase the utility of results

in interpretation and application (DeVellis, 2017; Lee & Lim, 2008). As indicated in the previous chapter, understanding the concepts of eustress and distress and the development of the LEDSS was guided by multiple theoretical frameworks. In reviewing the relevant theories from the previous chapter, it was concluded that the experience of eustress and/or distress is determined by the interpretation/appraisal of the given stressor. Therefore, LEDSS measures individual's interpretation and response to leisure-based stressors.

Leisure Constraints Model to Understand Eustress/Distress

A substantial body of literature exists on leisure constraints (Crawford & Godbey, 1987; Crawford et al., 1991; Jackson et al., 1993; Samdahl et al., 1999). Jackson (1997) defined constraints as “factors that are assumed by researchers and perceived or experienced by individuals to limit the formation of leisure preferences and to inhibit or prohibit participation and enjoyment in leisure” (p. 461). The concept of leisure constraints evolved to capture the idea of “negotiation” that explains the rationale for continuous leisure participation in the presence of different constraints (Kay & Jackson, 1991). Later, Samdahl and colleagues (1998, 1999) suggested that term “accommodation” better suits the idea of negotiation in the context of leisure as it pertains to individual activity devoid of social recognition or reconstruction, whereas negotiation is not. Despite the effort to utilize both negotiation and accommodation to better understand leisure constraints, a comprehensive framework yet remains absent (Schneider & Stanis, 2007).

During the early 21st century, leisure scholars suggested using a concept of “coping” under the umbrella of stress (Iwasaki & Schneider, 2003; Schneider & Wilhelm-Stanis, 2007). Coping in the context of leisure seems to describe how people manage stressful conditions while they continue to participate in leisure despite the existing constraints. Further, some of the

categories in constraint negotiation such as behavioral (e.g., time management, skill acquisition) and cognitive (e.g., ignoring the problem) strategies mirror those notions already developed and tested in the stress coping literature. Also, both the constraint and coping models are process oriented (Henderson & Bialeschki, 1993) and stress is identified as a type of leisure constraint (Crawford et al., 1991). Schneider and Stanis (2007) specifically suggested using Lazarus and Folkman's (1984) multi-phase iterative appraisal and coping process model to offer an alternative to view of the leisure constraint negotiation and accommodation process. Lazarus and Folkman's (1984) stress coping model is also the foundation of the psychological model of stress, which conceptualized stress as an interactive relationship between individual's cognitive appraisal of the stressor and the given stressor. Therefore, the idea of leisure constraints and the stress coping model being closely related, especially given how a person's process of appraising the given situation (i.e., stressor) is based on the influencing factors (e.g., personal belief, uncertainty, ambiguity).

Therefore, three components that distinguished how individuals experience leisure constraints were used as an initial guide to categorize leisure-based stressors: intrapersonal stressor, interpersonal stressor, and structural stressor (Crawford & Godbey, 1986). Since the three components of leisure constraints have been widely examined and validated (e.g., Getz & Page, 2019; Godbey et al., 2005; Hall & Page, 2014; Higham, 2018; Hubbard & Mannell, 2001; Jackson & Henderson, 1995), this approach was used to categorize leisure related stressors. Also, the hierarchical leisure constraints model proposed that individuals first encountered intrapersonal constraints and, if they were overcome, interpersonal constraints were then encountered, followed by the structural constraints (Crawford et al., 1991). This notion of having steps into the process of experiencing and negotiating constraints is similar to how leisure-based

eustress/distress is conceptualized in this study because a leisure-based stressor could be encountered before, during, and after leisure engagement with possibly an order between them (future study is needed to test this). Lastly, leisure distress can be viewed as similar to leisure constraint and possibly leisure eustress can be experienced as a result of leisure negotiation/accommodation (future research on this is necessary as well).

To summarize, stress coping is closely related with leisure constraints and how leisure constraints are categorized could be a good place to start thinking about leisure-based stress. However, it is important to note that the researcher was opened to where the data took the study, which means that these constraint categories may not “pan out” in the leisure eustress/distress measures. Rather, constraints were used as a guideline to conceptualize, visualize, and distinguish some of the possible items for the LEDS. Some possible leisure-based stressors are discussed in the following paragraphs.

Intrapersonal Stressor

Intrapersonal stressors involve individual attributes and psychological states that are present before, during, and after leisure engagement. Examples of intrapersonal leisure related stressors include limited physical, cognitive, and psychological abilities, inadequate level of challenge, boredom, perceived competence, lack of motivation, lacking locus of control, personal psychological state/attitudes, anxiety, and health concerns (e.g., fear of injury, chronic disease symptom flare-ups, health risks).

Interpersonal Stressor

Interpersonal stressors involve relationships between people or in the context of an interpersonal interaction. These stressors usually arise from the relationship/interpersonal

interaction that plays a stressor role disregard to the preference to the leisure activity itself. Also, lacking interpersonal resources or satisfaction when participating in leisure (e.g., unable to find a suitable partner) can be a stressor as well. Examples of interpersonal leisure related stressors are dissatisfaction, conflict, mismatched expectations or a misunderstanding with another person/people while doing leisure. This may include both participants and a leader/instructor, disengagement with family/spouse, lack of social support, and any ongoing issues with family or friends that may affect one's leisure experiences.

Structural Stressor

Structural stressors involve external sources that intervenes between individual's preference/desire to engage in leisure and actual participation. Examples of structural leisure-based stressors include developmental stages of life (e.g., intimacy vs isolation); family roles (e.g., being a caregiver, taking care of children); lack of resources such as money, transportation, programs offerings; availability of opportunities, and knowledge of such availability; and lastly policies or regulations that could interfere individual's leisure participation (e.g., covid-19 forcing fitness center closings, closing of Chicago's lakefront).

Although a majority of these stressors are framed as more distress than potentially eustress at a first glance, in fact they might be perceived as eustress as well. An example of this is found in literature where older adults utilized the SOC framework to maintain their valued leisure activities despite symptoms and/or limitations brought on by chronic health conditions (Hutchinson & Nimrod, 2012; Janke et al., 2009). Therefore, the list of intrapersonal, interpersonal, and structural stressors was used to guide the development of the constructs to be measured for LEDSD.

Phase 1: Item Development

Item development is one of the most important steps in scale development because items can either make or break an instrument (Lee & Lim, 2008). As DeVellis (2003) stated, item development must be done carefully in accordance with what is being measured and items should reflect the scale's purpose. Therefore, items were constructed to measure the specific dimensions of the types of leisure stressors identified above. The initial item pool for the LEDSS was developed from a thorough review of the literature and qualitative analysis derived from semi-structured in-depth interviews with older adults.

Interview Format

The purpose of the interviews was to better understand the concept of leisure based eustress and distress by exploring the experiences of how people deal with leisure-based stressors. Since there is such an absence of literature available about eustress and leisure with older adults, interviewees' (i.e., older adults) insights are invaluable. Interviews provided a qualitative source of information to supplement the theoretical and research contributions underlying the leisure-based eustress and distress construct. Interviews can be a useful method to understand participants' interpretations about the topic in question as well as assist in item and scale development (Morgan, 1988). Also, interviews have been shown to be effective in generating a rich understanding of individual beliefs and attitudes on a particular topic (Krueger, 2014). Therefore, interviews can be a suitable means to understand participants' interpretations about different stressors that may arise in the context of leisure. The primary investigator guided the discussion in the interviews around each participant's experiences dealing with leisure related stressors.

Interviewees were recruited from the E-Week listserv and Newsletter of the University of Illinois at Urbana-Champaign. In order to participate, individuals had to be between 60 and 80 years old, and this criterion was set to recruit older adults who have some level of independence and resources for leisure within their daily living. For this purpose, the focus was toward the aforementioned group of older adults instead of individuals who reside in nursing homes or who have severe ongoing health conditions that limit their daily living and engagement in leisure activities. Due to the onset of the COVID-19 pandemic, all interviews took place either through telephone or online (i.e., Zoom).

Specific protocols and guiding questions were used (see Appendix A) to stimulate and initiate conversation regarding leisure related stressors and how different constructs of leisure related stressors may be interpreted or perceived as either a challenge (i.e., eustress) and/or a threat (i.e., distress). In cases where participants needed clarification, some examples of leisure based stressors from the three different categories (i.e., intrapersonal, interpersonal, structural) were provided by the primary investigator. Some examples of interview questions are: “Are there any leisure activities that you used to enjoy but do not or cannot participate in anymore? And what made you discontinue those leisure activities and how did that make you feel?”, “What are some of the things that made you feel challenged when engaging in leisure activities?”, “How do you typically deal with those challenges?”, “What are some of the things that help you better deal with those difficulties?”, and “What are some of the things that may have caused you to react negatively to the stressful situation that you just described?” (See Appendix A).

Determine the Format of the Measurement

The response scale for each of the items for the LEDSS presented two corresponding 6-point Likert scales which allowed respondents to indicate their simultaneous positive and

negative appraisals/interpretations of the same given stressor item. Use of this ordinal rating technique was recommended for statements that could be easily judged to be either positive (i.e., favorable) or negative (i.e., unfavorable) in direction. As suggested by Rodriguez and colleagues (2013) when they developed the Valencia Eustress-Distress Appraisal scale, Likert scales will be worded differently for eustress and distress. By doing this, respondents can avoid appraising every encountered stressor as eustress and distress simultaneously, which would be over emphasizing the measurement of both eustress and distress from a single given stressor. The scale for eustress appraisal generated for the present study was as follows: 1 = very definitely is NOT a source of opportunity/positive challenge, 2 = definitely is NOT a source of opportunity/positive challenge, 3 = generally is NOT a source of opportunity/positive challenge, 4 = generally IS a source of opportunity/positive challenge, 5 = definitely IS a source of opportunity/positive challenge, 6 = very definitely IS a source of opportunity/positive challenge. The scale for distress appraisal was 1 = very definitely is NOT a source of threat/pressure, 2 = definitely is NOT a source of threat/pressure, 3 = generally is NOT a source of threat/pressure, 4 = generally IS a source of threat/pressure, 5 = definitely IS a source of threat/pressure, 6 = very definitely IS a source of threat/pressure.

Panel of Experts

Moving from phase 1 (interviews and item generation) to phase 2 (initial development and validation), an expert panel was identified and convened. The panel of experts was comprised of individuals with expertise who had published in any of the areas of aging/leisure theories (e.g., selective optimization with compensation), stress and coping with leisure, and leisure opportunities or constraints in communities. Their tasks were to provide feedback and guidance on the development of preliminary items for the LEDSS and assess how well the

literature was reflected in the items. After the interviews, a draft of the proposed items was distributed to the panel of experts along with specific questions for them to answer. Examples of those questions are: “How well do these items collectively capture the meaning of eustress and distress in the context of leisure?”, “To what extent are these items appropriate for older adults?”, and “To what extent do these items comprehensively include leisure as a context to older adults’ experience of eustress and distress?” The expert panel review also helped to establish face and content validity. In addition to answering the targeted questions, the experts ranked the relevance of each item of the construct being measured, identified other dimensions of the construct being measured that may have been missed, and evaluated the clarity of the items (DeVellis, 2017). The panel of experts’ responses to these targeted questions were gathered and used to make revisions, resulting in a next draft of the items. Changes were made based on the experts’ feedback and a revised set of items were drafted for phase 2.

Pilot Study

After the items were selected and refined based on the feedback received from the panel of experts, an initial version of the LEDS was administered to a pilot sample for a second round of revisions. The purpose of this pilot study was to receive feedback and comments on the clarity of instructions, readability of items, and general format of the scale from the older adults. This pilot was also an important step in the process to ensure the credibility of the qualitative interview analysis since participants were recruited from the E-Week listserv and Newsletter.

Phase 2: Initial Construction and Validation of the LEDS (Target Study)

In the next section of the study, the revised items were administered to a development sample and an evaluation of the items was conducted following the steps outlined by DeVellis (2017). The following subsections comprised the main part of the study.

The Development Sample

Participants and Procedures

There is no consensus on a recommendation for sample size to provide evidence of adequate reliability and validity for an instrument. For factor analysis, it is recommended that the ratio of number of participants to number of items be at least 10:1 with a minimum sample size of 200 (Mvududu & Sink, 2013). For instance, if an instrument contains 12 items, a minimum of 120 participants will be needed, however there must be at least 200. Similarly, Tinsley and Tinsley (1987) recommended a similar participant to items although they also stated that once a sample size exceeded 300, this requirement can be eased. When attempting to provide evidence of validity for a theoretical model, smaller sample sizes were found to be adequate (e.g., $N \geq 200$) during confirmatory factor analysis (CFA), however, a larger sample size ($N \geq 300$) was needed to fit a model to a population (Myers et al., 2011). Since the intent of this dissertation is to conduct a preliminary study to develop an initial scale for leisure based eustress and distress among older adults, one data set will be collected for the construction and validation process. The participant goal was to have a minimum ratio of 5:1 for participants to items and preferably 10:1.

In addition to the sample size, the representativeness of the sample for which the scale was intended is important to consider (DeVellis, 2017). The sample is comprised of older adults

who are age 50 and over. Among those who are age 50 and over, there could still exist wide variation in terms of functional abilities (e.g., physical, mental), the nature and severity of chronic health conditions, and access to financial and social support resources (e.g., expenses, transportation, companions, access to leisure programs). At the same time, that does not mean that the oldest old, who are the fastest growing population among older adults, should automatically be excluded from participating. Therefore, instead of delimiting participants based on their chronological age, their level of perceived health was assessed. Since this scale measures leisure-based eustress and distress, older adults who have some level of independence and resources for leisure within their daily living were recruited. A broader age range was thus applied, starting with those 50 years or older. Also, older adults with severe chronic conditions that limited their physical and/or mental abilities to independently engage in most types of daily leisure activities were not considered for this study. The target sample was recruited through Dynata/Survey Sampling International (SSI), which is an established online survey sampling company. SSI has been in existence for more than 45 years and it is widely used across over 80 countries, which attests to the expertise and credibility of the company. Also, SSI has expanded their recruiting pools from online communities to social networks and to various types of websites via banners and/or messages to obtain qualifying and representative data. Dynata is the world's largest first-party data and insight platform with 62 million consumers around the globe. Dynata is the cornerstone for precise and trustworthy quality data. There have been concerns raised about older adults' lack of knowledge of technology preventing them from completing online surveys, which could in turn restrict the generalizability of the results (Remillard et al., 2014). However, internet usage is increasing for all age groups with 65 and over being the fastest growing group since 2000 (Zickuhr & Madden, 2012). In the United States, while just 12 percent

of older adults were using the internet in 2000, the percentage increased to 67 percent in 2016 (Anderson & Perrin, 2017). With baby boomers entering old adulthood since 2011, internet use has now become a much more familiar context among older adults than it had been previously (Hargittai et al., 2019).

Evaluate the Items: Method of Analysis

The next step in the process of scale development is to “evaluate the performance of the individual items so that appropriate ones can be identified to constitute the scale” (p. 139). The methods used to check the LEDDS’s reliability and validity are explained in this section.

Reliability

The main study provided quantitative data for each item, as well as reliability estimates for the total instrument, which includes both dimensions of eustress and distress.

Internal Consistency (α). One index of reliability calculated for the LEDDS was estimated through Coefficient Alpha, a measure of internal consistency (Cronbach, 1951). This type of reliability is important because it estimates the extent to which the items on the scale are measuring the same characteristics (Benson & Clark, 1982). The LEDDS could be considered to be acceptably reliable by obtaining an overall alpha coefficient of at least .70 (DeVellis, 1991).

Item Discrimination Index (D). Item discrimination index (D) was assessed to discard any items and secure reliability in a different way. If the possible subscales (i.e., intrapersonal, interpersonal, and structural stressors) are highly correlated ($>.80$), the LEDDS could be considered a unitary measure, and if subscales are not highly correlated ($\leq.80$), subscales should be analyzed and treated separately.

Validation

The validation of a developed instrument is essential because it provides confidence that the LEDS is actually measuring the constructs it was intended to assess. Also, the validation of a newly developed instrument is considered an ongoing process as it requires various methods and different studies to demonstrate validity. For the purpose of this study, four methods were used to establish the initial validity of the LEDS instrument. These methods were face and content validity through use of an expert panel, two methods (convergent validity and factor analysis) to provide initial support for construct validity, and criterion validity by estimating the predictive validity of the instrument.

Face Validity. Face validity is defined as the degree to which respondents judge that the items of an assessment instrument are appropriate to the targeted construct and assessment objectives (Allen & Yen, 1979; Nevo, 1985). Face validity involves assessing whether there exists a logical relationship between the variable and the proposed measure. Although face validity is subjective in nature and uses logic and common sense as arguments for validity, it is a useful tool as a starting point before using other assessments to evaluate the validity of the instrument (Monette et al., 2013). In this study, the main investigator, interview participants, and the panel of experts assessed LEDS for face validity.

Content Validity. Content validity estimates whether a measuring device covers the full range of meanings or forms that are included in a variable (Monette et al., 2013). In other words, an instrument is considered to be content valid when the items adequately reflect the process and content dimensions of the specified objectives of the instrument as determined by expert opinion (Benson & Clark, 1982). Although face and content validity are often used interchangeably, they are conceptually different. Hardesty and Bearden (2004) provided an example of a dartboard to

distinguish these two types of validity. In order for content validity to be established, darts must land randomly all over the board to obtain a proper representation of the construct. If darts were located on only one side of the board (i.e., items were measuring only half of the domain of a construct), the measure would not be content valid. Using this dartboard analogy, an item has face validity if it hits the dartboard otherwise, the item does not represent the intended construct. Therefore, researchers must ensure that the items in the initial pool reflect the desired construct (i.e., hit the dartboard) and sample the entire domain of content. For this study, content validity was determined by the panel of experts using the Content Validity Index (CVI; Waltz & Bausell, 1981). CVI can be divided into two parts with Item-CVI (I-CVI) examining the content validity of individual items and Scale-CVI (S-CVI) examining the content validity of the overall scale. Expert panelists were asked to rate each item according to how relevant its meaning was to the overall construct of eustress or distress. For this study, I-CVI was examined using a 4-point ordinal scale, where 1 = item is not relevant, 2 = item needs some revision, 3 = relevant but needs minor revision, and 4 = very relevant. I-CVI is computed as the number of experts judging the items as relevant (i.e., assigning a rating of 3 or 4) divided by the total number of content experts. The interpretation of this proportion in regards to deciding the cut-off score varies by scholars (Abdollahpour et al., 2010; Davis, 1992; Waltz & Bausell, 1981). The following criteria was used to assess each item: If the I-CVI was higher than .79, the item was considered appropriate, if it was between .70 and .79, the item needs revision, and if it was less than .70, the item is eliminated (Abdollahpour et al., 2010). Once the I-CVI scores were calculated, the S-CVI score was calculated from the mean of the I-CVI scores. Appendix B provides for the I-CVI ratings used for this study.

Construct Validity. The essential question posed for construct validity is: does the instrument validly measure what it is purported to measure? (Nunnally, 1978) Construct validity focuses directly on response-data variations among items to ascertain evidence that the proposed content categories actually reflect the construct. The argument that the instrument actually measures the construct is only successful when relationships among the items (operational definitions) comprising the instrument, as well as relationships with specified variables from other known instruments, exist in a manner judged to be consistent with the conceptual and operational definitions. Construct validation also refers to the psychometric properties of a test, including expected internal consistency reliabilities and expected raw score distributions. Thus, construct validation is an ongoing process of testing hypotheses regarding response-data relationships for the items of the instrument under development with other known instruments (Gable & Wolf, 1993). For purposes of this study, initial support for construct validity was examined by determining the correlation (i.e., convergent validity) between the LEDS and other existing scales (i.e., Adolescent Distress-Eustress Scale), as well as by factor analysis.

Convergent Validity. According to DeVellis (1991), “convergent validity is the extent to which a measure behaves the way that the construct it purports to measure should behave with regard to established measures of other constructs” (p. 50). Convergent validity is one source of evidence for establishing construct validity since it is concerned with the theoretical relationship of a variable (e.g., a score on some scale) to other variables (Cronbach & Meehl, 1955). The idea of convergent indicators central to most validation efforts is that an individual who scores high on the test should score high on other presumed indicators of the construct being measured (Messick, 1989). Using the data collected from the sample, convergent validity was assessed by examining the correlation between the LEDS and a modified version of the Adolescent Distress-

Eustress Scale (ADES; Branson et al., 2019). Because the ADES measures how one would respond to pressure in general, the instruction of the scale was reworded to “how you would respond to pressure before, during, and after engaging in leisure activity.” The correlation between the LEDES and ADES is considered very good if their correlation is more than 0.7; however, a value of 0.50 and above can be considered acceptable (Hair et al., 2010). More detailed information about the scales used to examine convergent validity is explained in the following paragraphs.

Instruments. *Adolescent Distress-Eustress Scale* (ADES: Branson et al., 2019; see Appendix C) aims to capture both aspects of the stress response among socio-educationally diverse adolescent samples. The finalized scale consisted of two 5-item subscales (i.e., ADES-E: eustress and ADES-D: distress). Respondents were asked to describe how they responded to pressure in the last 7 days, and each item was scored on a 5-point Likert type scale with only the two extremes and the midpoint being labeled: “*Not like me (0), Somewhat like me (2), and Very much like me (4).*” As previously mentioned, the scale was modified so respondents can answer to how they responded to leisure related pressure in the last 7 days. The scores are computed separately across subscales and the sum of the 5 corresponding items for each eustress and distress are calculated. Some example of the ADES items are: “*I felt motivated*” and “*I felt the outcome was worth the effort*” for ADES-E and “*My mind was racing out of control*” and “*I felt panicked*” for ADES-D.

Factor Analysis. According to Hair and colleagues (1995), factor analysis is a “generic name given to a class of multivariate statistical methods whose primary purpose is to define the underlying structure in a data matrix” (p. 364). “Factor analysis is a method of identifying or verifying, within a given set of items, subsets of those items which are clustered together by

shared variation to form constructs or factors” (Gable & Wolf, 1993, p. 105). These empirically derived constructs are then compared with the judgmentally developed categories reviewed previously during the content validation phase. If meaningful covariation among items exists, the clustering of items to form subscales on the instrument are supported. The factor analysis method was used to identify any relationships among the LEDS items and to determine whether those factors are similar or re-define the components of the leisure related stressor construct. Although leisure related stressors are divided into three factors (i.e., intrapersonal, interpersonal, structural), there may be other meaningful and identifiable factors that may emerge in the solution which would provide further insights into the leisure-based stressor construct.

Methods of Factoring. The literature clearly distinguishes between two forms of factor analysis: exploratory and confirmatory approaches (DeVellis, 2017; Gable & Wolf, 1993). Exploratory Factor Analysis (EFA) is “commonly used to reduce the set of observed variables to a smaller, more parsimonious set of variables”, whereas Confirmatory Factor Analysis (CFA) is “used to assess the quality of the factor structure by statistically testing the significance of the overall model (e.g., distinction among scales), as well as the relationships among items and scales” (Hinkin et al., 1997, p.9). Both EFA and CFA were conducted in this study.

Exploratory Factor Analysis (EFA). A common factoring method is principal factor analysis (PFA: also called principal axis factoring or principal component analysis), and it is recommended because the principal-components method of analysis account for common, specific and random error variances (Ford et al., 1986; Rummel, 1988). The number of factors to be retained is not set and it depends on both underlying theory and empirical results. There are no exact rules for retaining items, however, *eigenvalues* and a *scree plot* are commonly used to determine the number of factors to retain (Cattell, 1966; DeVellis, 2017). The rationale for the

eigenvalues criteria was that any individual factor should account for variance of at least a single variable for it to be retained. With PFA, each variable contributes a value of 1 to the total eigenvalue. Thus, only the factors having eigenvalues greater than 1 (i.e., Kaiser criterion) are considered significant. All factors with eigenvalues less than 1 are considered insignificant and are disregarded. A scree plot is a graph that shows the relationship between the magnitude of the eigenvalues (Y-axis) and the number of factors (X-axis). It identifies a visual *elbow* in the components, suggesting the point at which component extraction should occur.

Also, *rotation* was conducted because unrotated factors are abstract and offer little meaning to the observer (DeVellis, 2017) and are considered “not sufficient” (Hair et al., 2010, p. 115). Unrotated factor analysis may identify the factors but generally not in a manner that is useful. Thus, factor rotation identifies those clusters of variables that are characterized by a single latent variable. As described by DeVellis (2017), an *orthogonal* rotation assumes the factors to be analyzed are uncorrelated whereas, an *oblique* rotation assumes the factors are correlated. The correlation matrix was reviewed to determine if item correlations were greater than .5, which is the acceptable minimum for item correlation. The results of the rotated analysis for each of the items (variables) should have a significant loading (>.40) on only one factor (Ford et al., 1986). More details and the results of the eigenvalues, scree plot, and factor rotation are presented in the next chapter.

Confirmatory Factor Analysis (CFA). EFA is useful for assessing the extent to which a set of items assesses a particular set of scales, but a major weakness of it is the inability to quantify the goodness-of-fit of the resulting factor structure (Long, 1983). Items that load clearly in an EFA may demonstrate a lack of fit in a multiple-indicator measurement model due to lack of external consistency (Gerbing & Anderson, 1988). Therefore, it is recommended that new

scales be subjected to CFA to confirm whether the prior analyses have been conducted thoroughly and appropriately. (Hinkin et al., 1997).

There are several statistics that can be used to assess goodness-of-fit. First is the model *chi-square* which permits the assessment of fit of a specific model, as well as the comparison between two models. When the chi-square is smaller, it means the model has a better fit (Hinkin et al., 1997). It has been suggested that a chi-square two or three times as large as the degrees of freedom is acceptable (Carmines & Mclver, 1981), however the fit is considered better the closer the chi-square value is to the degrees of freedom for a model (Thacker et al., 1989). Chi-square is sensitive to sample size; therefore, other measures of fit will also be conducted.

Muliak and colleagues (1989) recommended using *Adjusted Goodness of Fit Index*, and *Tucker-Lewis Index* to assess the correspondence between the proposed model and the data. In addition, the use of relative fit indices (e.g., *Normalized Fit Index*, *Comparative Fit Index*) has been suggested to control for the effects of sample size (Hinkin et al., 1997). Each of these indices measures the amount of variance and covariance accounted for in the model, and values range from 0 to 1. Although the interpretation of these indices is somewhat subjective, a value over .90 usually indicates a reasonably good model fit (Widaman, 1985). Also, an examination of *Root Mean Square Error of Approximation (RMSEA)* is often used to check the model fit indices in CFA with less than .05 indicating a good fit and between .05 and .10 a moderate fit (Hu & Bentler, 1999). Lastly, *confirmatory factor index (CFI)* is widely used to analyze the model fit by examining the discrepancy between the data and the hypothesized model, while adjusting for the issues of sample size inherent in the chi-squared test of model fit, and the normed fit index. CFI values range from 0 to 1, with larger values indicating a better fit. CFI > .95 indicates a great fit, but traditionally >.90 means satisfactory fit and >.80 is sometimes

permissible (Hu & Bentler, 1999). More detailed process and results of these statistical analyses for CFA are discussed in the next chapter.

Criterion validity. Criterion validity establishes validity by showing a correlation between the developed instrument and some other criterion or standard that has been already validated (Monette et al., 2013). There are three types of criterion validity which are predictive validity, concurrent validity, and postdictive validity. In this study, predictive validity will be used to check the criterion validity which is explained in the following paragraph.

Predictive Validity. In predictive validity, the scores on a developed instrument are meant to predict scores on some later measure (Cronbach & Meehl, 1955). Basically, there should be a correlation between the developed instrument and another instrument that measures a behavior or state that has resulted from the developed instrument. Some examples of those two relationships can be found by viewing students' overall academic performance and final exam scores. A student with excellent overall academic performance would likely have higher final exam scores, therefore there should be a significant positive correlation between these two variables. As stated above, the established instrument should predict some future state of affairs, therefore, a correlation between the LEDS and instrument and an instrument that measures the individual's state (e.g., leisure satisfaction) which can be predicted as a result of leisure based eustress will be checked for the criterion validity.

In this case, the LEDS has multi-dimensional variables from factor analysis, and each of the dimensions were examined according to their correlations with the predictive measures. This was done in order to minimize issues with multi-collinearity, which refers to the degree of correlation among predictor or independent variables or the degree of statistical independence found among these variables (Berry & Feldman, 1985). With high multicollinearity, it is difficult

to determine what is predicting the dependent or criterion variable, therefore the goal is to strive for low multicollinearity or lower correlations to minimize the conceptual overlap among the independent measures, which in this case are the multi-dimensional variables of LEDS.

Instruments. The *Leisure Satisfaction Scale* (LSS; Beard & Ragheb, 1980; see Appendix D) is a multi-dimensional scale that was developed to identify indicators relevant to the experience of leisure satisfaction. The reliability of the scale was assessed utilizing samples who were largely students. As a result of factor analysis, the scale has six dimensions that represent leisure satisfaction: psychological, educational, social, relaxation, physiological, and aesthetic. There are total of 24 items in the LSS with 4 items for each dimension. All questions are asked in a 5-point Likert scale and respondents read each statement (i.e., item) and mark if the item is “*Almost Never, Seldom, Sometimes, Often, and Almost Always*” true for them. The computed sum scores are calculated with higher scores indicating greater leisure satisfaction for respondents. Some examples of LSS items are: “*My leisure activities are very interesting to me*” (psychological), “*My leisure activities increase my knowledge about things around me*” (educational), “*I have social interaction with others through leisure activities*” (social), “*My leisure activities help me to relax*” (relaxation), “*My leisure activities are physically challenging*” (physiological), and “*The areas or places where I engage in my leisure activities are fresh and clean*” (aesthetic). LSS was used for predictive validity in order to check the LEDS. It was reasoned that respondents who score high on LEDS-E will likely score high on LSS whereas respondents with a higher score on LEDS-D will score inversely on the LSS.

Optimize Scale Length

As discussed by DeVellis (2017), the final step in the development of a scale is optimizing the scale length. In addition to the covariation among items, a scale’s Cronbach’s

alpha is also influenced by the number of items in the scale. According to DeVellis (2017), for “Items that have item-scale correlations about equal to the average inter-item correlation (i.e., items that are fairly typical), adding more will increase the alpha and removing more will lower it” (p. 146). Increasing the number of items to increase the alpha seems appealing; however it is important to consider the respondents who will be using the scale. For instance, people may be disinclined to sit for a long time to complete a survey. Having this in mind, those items that have a sufficiently lower than average correlation with the other items were removed, especially if reliability tests showed that Cronbach’s alpha increased by doing so.

A scale can also be optimized by removing items if a disproportionate number of items are loaded on a single factor (DeVellis, 2017; Hair et al., 2010). This is especially true if Cronbach’s alpha for the factored scale is greater than .90. When a disproportionate number of items load on one factor and the Cronbach’s alpha for that factored scale is greater than .90, then that scale will be optimized by selecting a smaller number of items that have the highest factor loading scores. Confirmation of the appropriateness of the optimized scale was determined by a subsequent reliability test, which will be discussed in the next chapter.

CHAPTER 4: FINDINGS

The purpose of this chapter is to present the results of the development and validation of the Leisure Eustress-Distress Scale (LEDS). The findings are presented in five sections with two sections for phase 1 of the study and three sections for phase 2 of the study. The first section describes item development procedures. The second section presents the process of item refinements from expert panelists' feedback and the results of the pilot study. The third section reports results of the reliability and factor analysis of the target study. Finally, the fourth section presents the results of LEDS validation using convergent validity with the reworded Adolescent Distress-Eustress Scale and predictive validity with the leisure satisfaction scale.

Item Development

In order to create the items for the LEDS, in-depth online/telephone interviews were conducted with older adults aged 60 and above. Participants were recruited from the University of Illinois at Urbana-Champaign's E-week Newsletter and listserv.

Description of Participants

One-on-one semi-structured in-depth interviews were conducted with 23 participants, 12 females and 11 males (see Table 2), who ranged in age from 64 to 86 years. The majority of the participants were Caucasian and most of them were retired with seven participants still working either full-time or part-time. Only two participants reported high school as their highest degree of education and 10 participants had a graduate degree. The participants' self-reported chronic conditions varied, but about half of the participants reported not having any ongoing health conditions.

Table 2. Description of Participants

Name	Age	Gender	Race	Marial Status	Education Level	Work Status	Ongoing Health Condition(s)
Irean	86	F	C	W	Some College	R	Broken wrist, breast/skin cancer, melanoma on leg, injured pelvic
Brock	71	M	C	Ma	Bachelor's Degree	R	N/A
Bonnie	68	F	C	Ma	Graduate Degree	FTW	N/A
Michael	67	M	C	D	Juris Doctor	FTW	Insulin dependent diabetes and asthma
Pam	74	F	C	W	High School	R	Broken rib
Jennifer	77	F	C	D	Graduate Degree	FTW	N/A
Alex	81	M	C	Ma	Doctor of Medicine	R	Two cancers
Lydia	79	F	C	Ma	Graduate Degree	R	N/A
Matt	64	M	C	Ma	Graduate Degree	FTW	Sleep apnea
Chris	72	M	C	S	Graduate Degree	R	Congestive heart failure and diabetes
Michelle	82	F	C	W	High School	N/A	N/A
Jake	65	M	C	Ma	Bachelor's Degree	R	N/A
Penny	70	F	C	Ma	Bachelor's Degree	R	N/A

Table 2 (cont.)

Name	Age	Gender	Race	Marial Status	Education Level	Work Status	Ongoing Health Condition(s)
Ryan	65	M	C	Ma	Graduate Degree	PTW	None
Brian	74	M	C	Ma	Graduate Degree	R	None
Nancy	72	F	AA	D	Bachelor's Degree	PTW	Arthritis and back problem
Jessica	68	F	C	Ma	Some College	N/A	Heart disease
Ben	79	M	C	Ma	Bachelor's Degree	R	Cancer, diabetes, and issues with knee and back
Anne	69	F	AA	Ma	Bachelor's Degree	R	None
James	83	M	C	Ma	Bachelor's Degree	R	Diabetes and heart disease
Olivia	81	F	C	W	Bachelor's Degree	R	Cancer, arthritis and knee problem
Will	74	M	C	D	Graduate Degree	R	Broken pelvis
Sophia	65	F	C	Ma	Bachelor's Degree	PTW	None
<p>M- Male, F- Female C- Caucasian, AA- African Asian Ma- Married, D- Divorced, W- Widowed, S- Single (not married) R- Retired, FTW- Full-time Work, PTW- Part-time Work</p>							

Themes that Emerged from the Interviews

The interview questions were designed to encourage the participants to reflect on their leisure related behaviors, feelings, emotions, and experiences prior to the COVID-19 pandemic. In the interviews, participants were mainly asked to think about leisure related constraints and challenges (i.e., stressors) that they faced before, during, and after engaging in the leisure activity. Also, they were asked to talk about their experiences with eustress and distress and possible connections (e.g., facilitator, motivator, barrier) with their life.

Leisure and stress. Initially, most of the interviewees had a difficult time relating leisure with stress. Because they appreciated leisure so much, any constraints or challenges they faced in the context of leisure were less likely considered as stress. Also, participants commonly indicated that leisure is a good, positive, and healthy thing to do, therefore even if stressors are encountered while doing leisure activities, it did not concern them too much. Another prevalent theme that emerged from the interview was that they placed work and leisure on the very opposite sides of the spectrum. For those who were still engaging in full-time or part-time work, participants predominantly associated stress with work and leisure with escaping from stress.

Leisure related stressors. Despite the fact that older adults were less likely to connect leisure with stress, a majority of the participants stated that leisure stressors did exist. After a series of questions and in-depth conversation, participants talked about a wide variety of leisure related stressors. There were many ways to group these stressors, but since it was decided to use the three dimensions from the leisure constraints as the guideline, leisure related stressors were grouped into intrapersonal, interpersonal, and structural dimensions.

Intrapersonal stressors included ongoing health issues, decreased physical and cognitive abilities, having lack of control, concerns about injury and health, lack of motivation, inadequate level of challenge, not being able to drive, fatigue, interference from previous injuries, failing to

manage time, not meeting their own expectations, adjusting to a new leisure activity (having learning curve), perceiving the activity as no longer fun or feeling bored, sudden or unexpected obligations/responsibilities, and so on.

Interpersonal leisure related stressors were scheduling time with friends, not being able to find playmates, having conflict with another person in the leisure group, dealing with annoying people in the activity who do not follow rules, losing a spouse or friends with whom they used to enjoy leisure together, interruptions by other people, other people making judgments about their activity performance, people not filtering what they say, and pressure to maintain some expectations of others. Lastly, structural leisure related stressors included not having enough money, lack of leisure programs offered, rarely having opportunities to participate, being bombarded with caregiving responsibilities, having too many work duties/responsibilities, and not being able to keep up with new knowledge and technology.

Among those three dimensions, older adults stated that interpersonal stressors were more difficult to deal with, which often ended up being an experience of distress rather than eustress. Participants stated that because they had no control over other people, interpersonal stressors caused much of their biggest source of distress. Individuals who faced structural stressors also reported distress. On the other hand, intrapersonal leisure related stressors were relatively easier for the participants to manage and therefore participants reported lower levels of distress. Also, older adults were able to develop strategies throughout the years to better overcome any obstacles or issues that arose from themselves. The intelligence they gained through years of experience were beneficial to managing stress in the context of leisure. They mentioned they learned to be more patient, they adopted a more positive mindset, and they described ways they adapted and were resilient in ways that helped them better deal with intrapersonal stressors.

Experience of eustress. Older adults reported occasionally experiencing leisure related eustress. When the commonalities on the factors that helped them better experience eustress were compared to others, four factors emerged. First, having control of the leisure activity was really important. This meant that participants had enough expertise and skills to participate in a certain leisure activity, had the resources (e.g., available programs, transportation) to do so, and had friends/family with whom to participate. When older adults perceived that they had an internal locus of control, they were able to more positively respond to stressors. Second, personality seemed to also play an important part. Many participants mentioned that they were more likely to perceive a leisure related stressor as something that they could overcome because of their personality characteristics.

Third, older adults' past life and job experiences seemed to relate to how they were able to respond to given stressors. Participants who had very stressful and/or demanding jobs seemed better able to respond to stressors (i.e., experienced eustress more often than distress). Also, participants who had more unstable and challenging life patterns or history were better able to respond to leisure related stressors. This group of participants (i.e., those having a higher level of demands from past/present work or life) expressed they really appreciated leisure and perceived their leisure engagement as a way of escaping from these demands. Therefore, it seemed they had a stronger will to evaluate stressors as eustress rather than as distress. Lastly, having a spiritual belief helped them to more often experience eustress. This was only prevalent among participants who expressed having spiritual and/or religious beliefs, but it was definitely a strong facilitator of eustress in the context of leisure.

Among these four emerged themes, having a sense of control was one of the most prevalent and emphasized aspects that facilitates the experience of eustress. Being one of the

most dominant factors for eustress, it was also one of the stressors that participants were most concerned about as they age. Whether it is physical and/or cognitive declines or lack of resources (e.g., not having leisure programs, no transportation), anything that could possibly cause them to lose control of their leisure engagement were considered as important stressors. Followed by the locus of control, their past job or life experiences was also important factor that influenced on how older adults perceive eustress. Although participants of this study were not familiar with the concept of eustress, it was evident that they were clearly experiencing some eustress in the context of leisure and factors such as locus of control, past job or life history, personality, and spiritual belief facilitated them to better experience eustress rather than distress.

Generation of Items

Based on the analysis of data gathered from the interviews, 83 items were initially created. After four rounds of refinement (i.e., combining similar items, rewording items to encompass broader themes, deleting items that were unique or specific to only a few participants), the number of items was reduced to 42. The 42 items were then slightly revised based on minor wording feedback from the committee members and were finalized for the next step (see Table 3).

Table 3. Initial List of Items Distributed to Panel of Experts

ITEMS
1. Physical pain happens when participating in some leisure activities
2. Ongoing health conditions interfere with leisure activity
3. I don't have anyone to do leisure activities with
4. There is an activity I want to engage in, but I don't have transportation to participate
5. I have to discontinue participating in a specific leisure activity due to health issues

Table 3 (cont.)

ITEMS
6. I am unable to do many leisure activities as well as I used to do them
7. The leisure activity is too challenging for my skill level
8. The leisure activity offered is not challenging enough for my skill level
9. I have different goals for the activity than other people, which could affect my enjoyment of the activity
10. Not enough time to participate in my leisure activity
11. I don't have enough energy to participate in my leisure activity
12. I have to take care of someone, so I can't participate in leisure activities the way I want to
13. I am concerned that symptoms related to ongoing health problems will flare while I am engaging in leisure
14. I worry about the possible risk of injury from engaging in the leisure activity
15. I am injured from participating in the leisure activity
16. I do not have enough money to participate in the leisure activity
17. Worries about performing the leisure activity well enough to feel good about my participation
18. I won't be able to meet the expectations of my leisure group
19. I have other obligations that prevent me from doing leisure
20. More time and effort is needed to learn and practice a new leisure activity
21. No access to the necessary equipment and/or supplies to engage in leisure
22. Decreased physical abilities affect my leisure engagement
23. Bad weather prevents and/or delays leisure engagement
24. I failed to manage my time well enough to participate in leisure activity
25. I am overloaded with work, so I have less time to participate in leisure
26. It is difficult to find a time that works for everyone to engage in a group/team leisure activity
27. I am unsure of my own physical limitations
28. I feel tired and fatigued from participating in the leisure activity
29. Other people will judge me negatively since I have not done this activity in a long time

Table 3 (cont.)

ITEMS
30. There aren't any available leisure opportunities or programs near me
31. Sudden and unexpected responsibilities and/or demands can prevent me from participating in leisure activity
32. I feel depressed and down, so I don't have any will to participate in the leisure activity
33. I feel discouraged because of my decreased physical abilities
34. When a leisure activity is no longer fun and/or enjoyable
35. I am concerned that I won't be able to do the activity well enough to participate
36. There is pressure to perform at a certain level while engaging in the leisure activity
37. It is difficult to keep up with the technology used for the leisure activity
38. I engage in the leisure activity, but I still feel a bit bored
39. I feel less motivated to participate in the leisure activity
40. Not in the mood to engage in the leisure activity
41. I want to do a leisure activity, but I can't seem to get started on the activity
42. I feel discouraged because of my decreased cognitive ability

Item Refinement

Once items were generated based on the literature and interviews conducted with 23 participants, a series of iterations were undertaken to create and revise the wording of the items to best encompass the emerged themes. The next step was to further refine the items based on the evaluation and feedback from the expert panelists and a pilot sample of older adults including the ones who previously participated in an interview. This was a critical process before the target study to enhance and secure the content validity of the scale (Waltz & Bausell, 1981) and the credibility of the qualitative data analysis (i.e., respondent validity/member checks: Maxwell, 2008).

Panel of Experts

Five expert panelists (i.e., Drs. Douglas Kleiber, Rebecca Genoe, Megan Janke, Jill Naar, & Julie Bobbit) individually evaluated the initial pool of 42 items as well as the instructions and measurement of the LEDS. Using the Item Content Validity Index form (see Appendix C), the expert panelists were asked to rate each of the 42 items using a 4-point ordinal scale from 1 = item is not relevant, 2 = item needs some revision, 3 = relevant but needs minor revision, and 4 = very relevant. Also, experts were asked to provide any comments concerning the wording, clarity, or meaning of any particular item. Lastly, expert panelists were asked to suggest any additional changes, if needed, to the LEDS (e.g., instruction, measurement).

Items. Table 4 presents the number of items judged by the expert panelists to be relevant (i.e., experts rating either 3-relevant but needs minor revision or 4-very relevant) on each of the 42 items. Inspection of the table shows that 11 items (26%) had agreement from all experts, and 26 items (62%) had four experts agree and one disagree. Lastly, five items showed agreement from three experts.

Table 4. Number of Items Experts Agreed on and Percentage

Number of Experts In Agreement	Number of Items	Percentage of Total Items
5 (all)	11	26
4	26	62
3	5	12

Table 5 summarizes expert panelists' ratings and feedback for each item comprising the initial version of LEDS. The mean score for each item rating varied from 2.8 to 4, Item Content Validity Index (I-CVI) varied as well from 0.7 to 1. The Scale Content Validity Index (S-CVI)

was 0.82 which is higher than 0.8, demonstrating excellent content validity of the scale.

However, 13 items had an I-CVI between 0.70 and 0.79, and revisions on those items were made based on the feedback and comments from the expert panelists (Polit & Beck, 2006).

An important suggestion was proposed by one of the expert panelists indicating that some of the items referred to how people deal with the causes of stress (e.g., constraints) rather than the experience (e.g., emotional arousal) itself. Some of the items were seen as very similar to a leisure constraints scale, and the goal of this study was to focus on the experience of eustress and distress while engaging in leisure activities. Thus, several items that described stressors that occur before a leisure experience were removed from the scale (i.e., item # 4, 5, 10, 13, 16, 17, 19, 21, 24, 26) even if its I-CVI was above 0.8. Some examples of those items are: item #4 – there is an activity I want to engage in, but I don't have transportation to participate; item #5 – I have to discontinue participating in a specific leisure activity due to health issues; item #16 – I do not have enough money to participate in the leisure activity; and item #26 – it is difficult to find a time that works for everyone to engage in a group/team leisure activity. The removed items can indeed cause stress in the context of leisure, therefore, are leisure related stressors. However, since those stressors are more of constraints that keep people from engaging in leisure activities in the first place, I decided to accept panel of experts' feedback which left LEDS with 32 items (Table 6). All items were revisited and reworded to ensure the proposed items (i.e., stressors) capture a person's emotional state and experience of leisure related stress.

Table 5. Summary of Expert Panelists' Review

Item #	Experts in Agreement	Mean Score of Item Rating (scale of 1-4)	Item Content Validity Index (I-CVI)	Status for Pilot Study (I, R, D)	Item #	Experts in Agreement	Mean Score of Item Rating (scale of 1-4)	Item Content Validity Index (I-CVI)	Status for Pilot Study (I, R, D)
1	5/5	3.6	.9	I	22	5/5	3.6	.9	I
2	4/5	3	.75	R	23	4/5	3	.75	R
3	4/5	3.2	.8	R	24	3/5	2.8	.7	D
4	4/5	3.2	.8	D	25	4/5	3	.75	R
5	4/5	3.2	.8	D	26	4/5	3.2	.8	D
6	4/5	3	.75	R	27	4/5	3.4	.85	I
7	4/5	3.4	.85	I	28	4/5	3.25	.81	I
8	3/5	3.2	.8	I	29	4/5	3.2	.8	I
9	4/5	3	.75	R	30	5/5	4		I
10	4/5	3	.75	D	31	4/5	3.6	.9	I
11	3/5	3.2	.8	I	32	5/5	3.8	.95	I
12	4/5	3.2	.8	I	33	5/5	3.8	.95	I
13	4/5	3.2	.8	D	34	5/5	3	.75	R
14	5/5	3.8	.95	I	35	5/5	3.6	.9	I
15	4/5	3	.75	R	36	5/5	3.75	.94	I
16	4/5	3.4	.85	D	37	4/5	3.4	.85	I
17	4/5	2.8	.7	D	38	4/5	3.4	.85	I
18	5/5	2.8	.7	R	39	4/5	3.2	.8	I
19	4/5	3.4	.85	D	40	4/5	2.8	.7	R
20	4/5	3.2	.8	I	41	5/5	3.8	.95	I
21	4/5	2.8	.7	D	42	5/5	4	1	I

Item Status for Pilot Study (I=Included, R=Revised, D=Deleted)

Table 6. Revised List of Items after Panel of Experts' Review

ITEMS
1. I experience physical pain when participating in some leisure activities
2. I am worried that ongoing health conditions may interfere with some of my leisure activities
3. No one is available to do some leisure activities with me
4. I feel discouraged because I am unable to do leisure activities as well as I used to do them
5. Some leisure activities are too challenging for my skill level
6. Some leisure activities are not challenging enough for my skill level
7. I have different goals for the activity than other people, which could affect my enjoyment of the activity
8. I don't have enough energy to participate in my leisure activities
9. I can't fully focus on leisure activities because I have caregiving responsibilities
10. I worry about the possible risk of injury from engaging in leisure activities
11. My injury interferes with my participation in leisure activities
12. I worry I won't be able to meet the expectations of my leisure group
13. I need more time and effort to learn and practice new leisure activities
14. My decreased physical abilities affect my leisure engagement
15. Unexpected bad weather (e.g., rain, heat, snow) prevents and/or delays leisure engagement
16. I am overloaded with many obligations, so I have less time to participate in leisure activities
17. I am not fully aware of my own physical limitations
18. I feel discouraged because I am fatigued from doing leisure activities
19. I worry that people may judge me negatively since I have not done this activity in a long time
20. There aren't any available leisure opportunities or programs near me
21. Sudden and unexpected responsibilities and/or demands can prevent me from participating in leisure activities
22. I feel depressed and down, so I am not motivated to participate in leisure activities
23. I feel discouraged because of my decreased physical abilities

Table 6 (cont.)

ITEMS
24. I feel some leisure activities are no longer fun and/or enjoyable
25. I am concerned that I won't be able to do leisure activities well enough to participate
26. I feel pressured to perform at a certain level while engaging in leisure activities
27. I am not confident that I can keep up with the technology used for some leisure activities
28. I engage in leisure activities, but I still feel a bit bored when I do some of them
29. Lately, I feel less motivated to participate in the leisure activity
30. Sometimes, I am not in the mood to engage in leisure activities
31. I want to do a leisure activity, but I just can't seem to get started on the activity
32. I feel discouraged because of my decreased cognitive ability

Measurements. Another expert panelist gave feedback about the measurement scale of the LEDS. The initial proposed measurement for LEDS used a 6-point Likert scale for both eustress and distress with response choices being 1=always not, 2=mostly not, 3=occasionally not, 4=occasionally is, 5=mostly is, and 6=always is a source of “opportunity/positive challenge” for eustress and “threat/pressure” for distress. The feedback from one of the expert panelists indicated that the wording of the measurement (e.g., “always not” and “mostly not”) is confusing and less clear. Also, they indicated that it was hard to distinguish the difference between “occasionally not a source of” and “occasionally is a source of,” because they felt that if it is “occasionally not a source of opportunity” then it could also mean “occasionally is a source of opportunity.” This feedback was helpful, so changes were made to the measurement scale to make it more clear (Table 7). First, the wording “always not” and “mostly not” was changed into “never” and “rarely.” Since there is no longer a need to distinguish measurements with “not” and “is”, those terms were removed as well. With those changes, the revised measurement for LEDS used a 5-point Likert scale.

Table 7. Revised measurements for LEDS

Eustress		Distress	
1 = never a source of	Positive challenge/opportunity	1 = never a source of	Threat/pressure
2 = rarely a source of		2 = rarely a source of	
3 = occasionally a source of		3 = occasionally a source of	
4 = mostly a source of		4 = mostly a source of	
5 = always a source of		5 = always a source of	

Pilot Study

As a result of the expert panel review, 32 revised items and measurement scale became the focus of the pilot study. The purpose of the pilot study was to receive insights and request feedback on the revised LEDS from the older adult respondents. Participants were asked to complete the LEDS and provided any feedback about the clarity of instructions, understandability and readability of the items and measurement, and their opinion about how easy or difficult it was to answer the questions. The participants were recruited from the list of older adults who were 60 years or older who had volunteered to participate for the Phase 1 study. As a result, LEDS was pilot tested using a convenience sample of 55 participants. Out of 55 participants, there were 49 valid cases as 6 cases had missing data on items, instructions, and measurement feedback questions. About a third (n = 17) of the participants had actually participated in the interview for Phase 1 study.

A majority of the participants answered that the items were easy to understand. Several respondents indicated that some items were a bit confusing, yet there were no overlapping items that needed attention for the revision. Most of the participants stated that LEDS had very clear and easy instructions to follow. However, several respondents mentioned it was difficult for

them to suddenly change their perspectives/viewpoints and train of thought from positive challenge/opportunity (i.e., eustress) to threat/pressure (i.e., distress). This feedback suggested the instructions warranted revision by creating two parts (i.e., eustress and distress). Instructions were placed before each scale, so that respondents could read brief explanations about each along with corresponding instructions, which helped remind them about the difference between eustress and distress constructs.

To summarize, as a result of item refinement from the expert panel review and pilot study, 10 items were deleted, and 10 additional items were revised. The measurement scale was changed from a 6-point Likert scale to 5-point Likert scale and less confusing wording was adopted for several of the items. Finally, instructions were slightly reworded and repositioned, so that respondents could more easily switch from one concept to another when answering the survey.

Target Study: Reliability

Description of Target Sample

Of the 438 surveys received, 402 were considered valid cases as 36 participants submitted it uncompleted. The 402 valid cases of participants who met the inclusion criteria for the target study (i.e., 50 years or older) represented older adults partially including middle-aged adults. The target study sample's age ranged from 50 to 90 years with mean age of 67.47 years (SD = 8.27). Gender was almost equally distributed with 203 males (50.62%) and 198 females (49.38%). In terms of highest level of education, around 30 percent of respondents had earned a high school diploma or similar (e.g., trade school) and no more than a third had a graduate degree (e.g., Master's degree, Ph.D., M.D.). Little over half of our participants were married

(61.2%), followed by divorced (12.7%), single (12.4%), widowed (10.4%), and living with partner (3%). Respondents' income was well distributed across the three categories: \$0 - \$49,999 (32.4%), \$50,000 - \$99,999 (27.8%), and \$100,000 or above (39%). Lastly, about 88 percent of our participants were Caucasian (white). Table 8 shows the descriptive summary of target sample.

Table 8. Descriptive Summary of Target Sample

Age (n=399)			Gender (n= 401)	
Range	Mean	SD	Male	Female
50-90	67.47	8.271	203 (50.62 %)	198 (49.38 %)

Highest Degree Earned	N	Percent (%)
Some High School	1	.2
Graduated High School/GED	92	22.9
Trade School	16	4.0
Some College	62	15.4
Associates Degree	26	6.5
Bachelor's Degree	76	18.9
Graduate School	125	31.1
Other (please specify)	4	1.0

Marital Status	N	Percent (%)
Single, not married	50	12.4
Married	246	61.2
Living with partner	12	3.0
Divorced	51	12.7
Widowed	42	10.4
Other	1	.2

Table 8 (cont.)

Income	N	Percent (%)
Less than \$20,000	38	9.5
\$20,000 to \$34,999	51	12.7
\$35,000 to \$49,999	41	10.2
\$50,000 to \$74,999	64	15.9
\$75,000 to \$99,999	48	11.9
\$100,000 to \$149,999	62	15.4
Over \$150,000	95	23.6
Prefer not to answer	3	.7

Race/ethnicity	N	Percent (%)
African American	20	5.0
Asian	13	3.2
Caucasian (white)	355	88.3
Latino/Latina	6	1.5
Native American	3	.7
Other	2	.5
Prefer not to answer	3	.7

In addition to the demographic information, participants were asked whether they provide any assistance to another individual or loved one (e.g., caregiver), how many people live in their household, whether they have family/friends who live nearby, and their perceived health. Table 9 summarizes that information.

Table 9. Additional Information about Target Study Participants

Do you provide any assistance to another individual or loved one?		
	Frequency	Percentage
Yes	65	16.2
No	335	83.3

Including you, how many people live in your household?		
	Frequency	Percentage
1 person	109	27.1
2 people	224	55.7
3 people	38	9.5
4 people	20	5.0
5 or more people	6	1.5

Do you have family/friends who live nearby?		
	Frequency	Percentage
Yes	257	63.9
No	142	35.3

In general, how would you rate your health?		
	Frequency	Percentage
Excellent	43	10.7
Very good	143	35.6
Good	146	36.3
Fair	65	16.2
Poor	5	1.2

Internal Structure of the LEDS

Item Analysis. The means, standard deviations, skewness, kurtosis, and item intercorrelations were calculated to examine the 64 items (eustress- 32 items and distress – 32 items). On the basis of skewness and kurtosis, no items were eliminated. The distributions, means, and standard deviations of scores for the LEDS total and factor-based subscales, including the range and classification, is provided below (Table 10). It should be noted that the mean scores for both eustress and distress ranged from 1.52 to 2.53 for eustress and 1.57 to 2.48 for distress, which is heavily skewed towards the lower end of each scale. This means that for both eustress and distress, sample members had less reaction to the stressors whether they perceived them as a positive challenge/opportunity or threat/pressure.

Table 10. Descriptive Analysis of LEDS – Eustress and LEDS – Distress

	Mean	SD	Skewness	Kurtosis		Mean	SD	Skewness	Kurtosis
E1	2.29	1.036	0.441	-0.316	D1	2.39	1.194	0.550	-0.486
E2	2.34	1.083	0.415	-0.496	D2	2.32	1.216	0.572	-0.624
E3	2.32	1.084	0.344	-0.804	D3	2.23	1.188	0.624	-0.616
E4	2.36	1.180	0.445	-0.775	D4	2.39	1.241	0.490	-0.756
E5	2.53	1.090	0.224	-0.634	D5	2.47	1.169	0.427	-0.582
E6	2.01	0.886	0.590	-0.077	D6	1.97	0.981	0.873	0.336
E7	2.32	0.983	0.271	-0.536	D7	2.21	1.113	0.665	-0.216
E8	2.16	1.043	0.599	-0.385	D8	2.21	1.156	0.690	-0.364
E9	1.52	0.932	1.774	2.268	D9	1.57	1.002	1.814	2.599
E10	2.08	1.027	0.690	-0.088	D10	2.17	1.145	0.807	-0.094
E11	1.96	1.139	0.948	-0.138	D11	2.07	1.232	0.883	-0.302
E12	1.91	1.007	0.869	-0.139	D12	1.96	1.102	1.044	0.302
E13	2.08	1.048	0.646	-0.419	D13	2.19	1.156	0.678	-0.368
E14	2.20	1.133	0.508	-0.737	D14	2.27	1.258	0.628	-0.677

Table 10 (cont.)

	Mean	SD	Skewness	Kurtosis		Mean	SD	Skewness	Kurtosis
E15	2.40	0.964	0.184	-0.350	D15	2.35	1.089	0.450	-0.341
E16	1.82	0.950	0.967	0.160	D16	1.82	1.017	1.218	0.991
E17	2.08	1.056	0.657	-0.488	D17	2.16	1.089	0.731	-0.113
E18	2.12	1.091	0.683	-0.354	D18	2.26	1.151	0.629	-0.396
E19	1.85	1.041	1.006	0.111	D19	1.88	1.092	1.081	0.270
E20	1.87	0.998	0.913	-0.048	D20	1.91	1.091	1.097	0.458
E21	1.96	0.968	0.777	-0.015	D21	2.09	1.110	0.823	-0.003
E22	1.83	1.056	1.190	0.682	D22	1.95	1.163	1.059	0.170
E23	2.08	1.165	0.828	-0.262	D23	2.24	1.249	0.707	-0.530
E24	2.25	1.050	0.439	-0.537	D24	2.28	1.098	0.630	-0.168
E25	2.08	1.041	0.658	-0.320	D25	2.20	1.151	0.773	-0.110
E26	1.93	1.066	0.906	-0.135	D26	2.00	1.143	0.926	-0.038
E27	2.05	1.037	0.521	-0.876	D27	2.10	1.119	0.715	-0.475
E28	2.04	0.922	0.658	0.002	D28	2.08	1.019	0.702	-0.136
E29	2.19	1.086	0.536	-0.598	D29	2.29	1.216	0.588	-0.619
E30	2.45	0.981	0.252	-0.304	D30	2.48	1.099	0.420	-0.281
E31	2.18	1.021	0.408	-0.685	D31	2.28	1.117	0.550	-0.451
E32	1.68	1.005	1.352	0.917	D32	1.77	1.109	1.345	0.869

Inter-Item Correlations. Separate inter-item correlations for each of the eustress and distress scales were calculated (see Table 11 for the eustress scale and Table 12 for the distress

scale). The correlations for eustress items ranged from .14 to .75, and for distress items from .13 to .83. There was mostly moderate to high variance in Pearson product moment correlations among items. No items were eliminated on the basis of inter-item correlations.

Table 11. Correlations Between the 32 LEDS-Eustress Scale Items

	eus 1	eus 2	eus 3	eus 4	eus 5	eus 6	eus 7	eus 8	eus 9	eus 10	eus 11	eus 12	esu 13	eus 14	eus 15	eus 16
eus 1	--															
eus 2	.64	--														
eus 3	.17	.27	--													
eus 4	.52	.64	.34	--												
eus 5	.47	.59	.35	.69	--											
eus 6	.18	.13*	.19	.16	.13*	--										
eus 7	.35	.34	.27	.37	.41	.42	--									
eus 8	.43	.57	.35	.57	.56	.14	.35	--								
esu 9	.20	.24	.33	.25	.25	.24	.28	.36	--							
eus 10	.46	.60	.30	.53	.55	.17	.40	.55	.36	--						
eus 11	.57	.65	.25	.60	.56	.24	.37	.57	.42	.66	--					
eus 12	.38	.52	.28	.51	.48	.21	.43	.56	.39	.54	.61	--				
eus 13	.36	.42	.32	.42	.48	.33	.44	.51	.42	.51	.53	.58	--			
eus 14	.50	.66	.29	.67	.64	.19	.45	.68	.29	.56	.68	.60	.57	--		
eus 15	.37	.29	.20	.31	.40	.24	.34	.28	.23	.29	.32	.22	.36	.37	--	
eus 16	.30	.30	.33	.34	.32	.23	.31	.39	.52	.39	.42	.42	.45	.31	.36	--
eus 17	.30	.30	.32	.31	.33	.30	.32	.39	.33	.36	.38	.43	.47	.35	.20	.41
eus 18	.47	.61	.33	.64	.61	.24	.45	.67	.35	.59	.60	.63	.56	.73	.34	.36
eus 19	.36	.49	.29	.44	.43	.27	.43	.52	.39	.53	.52	.68	.56	.56	.27	.39

Table 11 (cont.)

	eus 1	eus 2	eus 3	eus 4	eus 5	eus 6	eus 7	eus 8	eus 9	eus 10	eus 11	eus 12	esu 13	eus 14	eus 15	eus 16
eus 20	.31	.29	.40	.33	.36	.29	.34	.49	.43	.33	.44	.47	.51	.44	.29	.42
eus 21	.33	.36	.30	.38	.38	.27	.39	.40	.49	.39	.44	.44	.48	.42	.39	.58
eus 22	.42	.50	.40	.51	.51	.27	.45	.60	.44	.53	.60	.63	.55	.58	.36	.48
eus 23	.48	.64	.32	.70	.61	.18	.39	.70	.34	.63	.68	.58	.49	.73	.33	.36
eus 24	.46	.57	.32	.58	.57	.25	.46	.61	.31	.67	.64	.58	.54	.65	.34	.37
eus 25	.45	.58	.26	.62	.62	.25	.49	.67	.34	.61	.64	.66	.59	.69	.33	.39
eus 26	.31	.40	.29	.42	.41	.29	.43	.48	.39	.45	.49	.55	.53	.51	.25	.43
eus 27	.26	.33	.23	.35	.35	.25	.35	.43	.28	.43	.38	.46	.50	.42	.29	.25
eus 28	.31	.28*	.36	.37	.39	.30	.43	.45	.40	.40	.36	.41	.47	.36	.30	.42
eus 29	.42	.51	.34	.57	.50	.21	.40	.69	.31	.53	.55	.56	.50	.63	.34	.39
eus 30	.43	.50	.31	.52	.52	.20	.47	.60	.37	.55	.55	.51	.48	.58	.38	.37
eus 31	.41	.48	.37	.57	.56	.25	.42	.62	.36	.53	.53	.57	.55	.65	.36	.43
eus 32	.38	.44	.27	.46	.43	.24	.37	.58	.44	.54	.59	.52	.52	.49	.37	.40

	eus 17	eus 18	eus 19	eus 20	eus 21	eus 22	eus 23	eus 24	eus 25	eus 26	eus 27	eus 28	eus 29	eus 30	eus 31	eus 32
eus 1																
eus 2																
eus 3																
eus 4																
eus 5																
eus 6																
eus 7																
eus 8																

Table 11 (cont.)

	eus 17	eus 18	eus 19	eus 20	eus 21	eus 22	eus 23	eus 24	eus 25	eus 26	eus 27	eus 28	eus 29	eus 30	eus 31	eus 32
esu 9																
eus 10																
eus 11																
eus 12																
eus 13																
eus 14																
eus 15																
eus 16																
eus 17	--															
eus 18	.42	--														
eus 19	.42	.64	--													
eus 20	.39	.51	.51	--												
eus 21	.36	.48	.44	.49	--											
eus 22	.44	.67	.60	.51	.47	--										
eus 23	.37	.74	.58	.43	.42	.72	--									
eus 24	.41	.67	.57	.46	.41	.61	.72	--								
eus 25	.40	.71	.68	.51	.47	.63	.72	.75	--							
eus 26	.40	.55	.59	.46	.42	.55	.54	.52	.60	--						
eus 27	.35	.48	.46	.43	.37	.45	.44	.44	.51	.43	--					
eus 28	.42	.46	.41	.44	.37	.53	.45	.48	.47	.51	.45	--				
eus 29	.40	.65	.59	.49	.41	.64	.71	.65	.68	.52	.45	.51	--			

Table 11 (cont.)

	eus 17	eus 18	eus 19	eus 20	eus 21	eus 22	eus 23	eus 24	eus 25	eus 26	eus 27	eus 28	eus 29	eus 30	eus 31	eus 32
eus 30	.36	.59	.52	.40	.46	.58	.67	.64	.64	.47	.46	.55	.70	--		
eus 31	.41	.64	.54	.48	.45	.66	.68	.63	.68	.50	.47	.56	.69	.71	--	
eus 32	.45	.57	.49	.49	.41	.62	.64	.58	.60	.49	.47	.46	.54	.51	.58	--

Note. Correlations .13 and above are significant at $p < .05$, and correlations .17 and above are significant at $p < .0001$.

Table 12. Correlations Between the Initial Pool of 32 Items for LEDS-Distress Scale

	dis 1	dis 2	dis 3	dis 4	dis 5	dis 6	dis 7	dis 8	dis 9	dis 10	dis 11	dis 12	dis 13	dis 14	dis 15	dis 16
dis 1	--															
dis 2	.72	--														
dis 3	.29	.42	--													
dis 4	.66	.77	.49	--												
dis 5	.54	.64	.47	.70	--											
dis 6	.27	.31	.39	.36	.41	--										
dis 7	.50	.59	.50	.61	.56	.52	--									
dis 8	.63	.74	.48	.72	.67	.41	.61	--								
dis 9	.34	.35	.43	.34	.23	.41	.47	.44	--							
dis 10	.64	.72	.43	.72	.62	.31	.58	.64	.36	--						
dis 11	.69	.76	.35	.73	.57	.35	.54	.66	.39	.70	--					
dis 12	.52	.63	.45	.67	.59	.45	.66	.62	.41	.64	.66	--				
dis 13	.45	.54	.52	.61	.62	.49	.60	.58	.42	.54	.49	.62	--			
dis 14	.66	.82	.41	.81	.70	.35	.57	.75	.33	.69	.75	.67	.62	--		
dis 15	.44	.43	.43	.44	.48	.40	.49	.45	.34	.40	.38	.38	.52	.43	--	
dis 16	.33	.40	.50	.45	.40	.42	.52	.51	.66	.40	.45	.47	.58	.42	.48	--

Table 12 (cont.)

	dis 1	dis 2	dis 3	dis 4	dis 5	dis 6	dis 7	dis 8	dis 9	dis 10	dis 11	dis 12	dis 13	dis 14	dis 15	dis 16
dis 17	.27	.30	.26	.37	.28	.28	.32	.27	.28	.32	.30	.31	.28	.29	.13	.25
dis 18	.60	.73	.46	.74	.60	.37	.58	.74	.35	.61	.60	.63	.59	.73	.40	.40
dis 19	.52	.58	.44	.62	.54	.38	.64	.62	.43	.63	.59	.74	.61	.61	.35	.46
dis 20	.37	.43	.54	.41	.36	.42	.52	.48	.42	.42	.38	.49	.49	.44	.41	.46
dis 21	.42	.51	.49	.52	.46	.34	.52	.53	.54	.50	.50	.52	.55	.47	.46	.63
dis 22	.53	.62	.54	.66	.54	.43	.59	.70	.47	.60	.59	.62	.53	.62	.44	.53
dis 23	.63	.80	.47	.82	.67	.34	.59	.74	.34	.71	.74	.65	.56	.83	.40	.44
dis 24	.62	.68	.47	.71	.67	.36	.57	.71	.35	.65	.63	.62	.55	.72	.48	.42
dis 25	.64	.74	.45	.76	.69	.33	.59	.71	.33	.71	.70	.73	.60	.77	.45	.41
dis 26	.46	.56	.51	.61	.55	.41	.58	.59	.40	.55	.53	.70	.56	.60	.43	.49
dis 27	.42	.49	.47	.49	.53	.36	.49	.52	.32	.52	.41	.51	.60	.52	.46	.39
dis 28	.41	.50	.58	.52	.47	.53	.56	.56	.47	.51	.43	.53	.55	.45	.47	.49
dis 29	.56	.68	.51	.73	.62	.38	.57	.74	.34	.63	.63	.63	.55	.69	.40	.42
dis 30	.55	.65	.56	.69	.61	.44	.62	.68	.41	.60	.57	.59	.58	.63	.46	.44
dis 31	.57	.65	.57	.71	.60	.41	.63	.73	.46	.62	.62	.60	.59	.67	.43	.54
dis 32	.54	.59	.38	.56	.50	.38	.54	.64	.46	.55	.56	.59	.51	.60	.38	.44

	dis 17	dis 18	dis 19	dis 20	dis 21	dis 22	dis 23	dis 24	dis 25	dis 26	dis 27	dis 28	dis 29	dis 30	dis 31	dis 32
dis 1																
dis 2																

Table 12 (cont.)

	dis 17	dis 18	dis 19	dis 20	dis 21	dis 22	dis 23	dis 24	dis 25	dis 26	dis 27	dis 28	dis 29	dis 30	dis 31	dis 32
dis 3																
dis 4																
dis 5																
dis 6																
dis 7																
dis 8																
dis 9																
dis 10																
dis 11																
dis 12																
dis 13																
dis 14																
dis 15																
dis 16																
dis 17	--															
dis 18	.42	--														
dis 19	.33	.63	--													
dis 20	.23	.47	.55	--												
dis 21	.26	.48	.51	.47	--											
dis 22	.23	.64	.61	.51	.53	--										
dis 23	.35	.76	.66	.43	.52	.71	--									
dis 24	.35	.71	.60	.46	.45	.63	.71	--								

Table 12 (cont.)

	dis 17	dis 18	dis 19	dis 20	dis 21	dis 22	dis 23	dis 24	dis 25	dis 26	dis 27	dis 28	dis 29	dis 30	dis 31	dis 32
dis 25	.35	.74	.70	.48	.47	.61	.79	.79	--							
dis 26	.35	.58	.68	.54	.52	.58	.62	.60	.68	--						
dis 27	.30	.50	.50	.45	.40	.49	.52	.56	.60	.52	--					
dis 28	.31	.55	.51	.55	.53	.59	.51	.61	.54	.56	.55	--				
dis 29	.32	.68	.60	.50	.46	.71	.72	.72	.69	.53	.52	.56	--			
dis 30	.35	.68	.54	.44	.52	.66	.66	.68	.63	.52	.48	.59	.73	--		
dis 31	.38	.69	.59	.53	.55	.64	.65	.67	.67	.54	.50	.58	.74	.79	--	
dis 32	.27	.55	.54	.39	.46*	.60	.61	.53	.57	.55	.57	.52	.56	.52	.60	--

Note. All correlations are significant at the .0001 level.

Table 13 and 14 presents the reliability statistics for the 32 LEDS – Eustress and Distress items respectively. The internal consistency of the target LEDS – Eustress scale, estimated through Coefficient alpha, was .963, and the average inter-item correlation was .67. The Coefficient alpha for the LEDS – Distress scale was .97 with an inter-item correlation of .72. Item functioning was assessed through the item-total correlation to determine how well each item discriminated among respondents with different levels of leisure related eustress. There was no item with an item-total correlation less than zero and all the items were higher than .33, therefore, none of the items were subsequently deleted at this step. Next, ‘Alpha if item deleted’ from each item were carefully evaluated. There was no item that if deleted will lead to a ‘substantial increase in the scale’s Cronbach’s value, again, no items were deleted.

Table 13. Summary Item Analysis Statistics for LEDES – Eustress

Cronbach alpha: .96, Standardized alpha: .96

Average inter-item correlation: .67 (n=402).

Item #	Item-Total Correlation	Alpha if deleted	Item #	Item-Total Correlation	Alpha if deleted
E1	.57	.96	E17	.53	.96
E2	.67	.96	E18	.81	.96
E3	.43	.96	E19	.72	.96
E4	.70	.96	E20	.61	.96
E5	.69	.96	E21	.60	.96
E6	.33	.97	E22	.78	.96
E7	.57	.96	E23	.81	.96
E8	.75	.96	E24	.78	.96
E9	.50	.96	E25	.82	.96
E10	.71	.96	E26	.67	.96
E11	.75	.96	E27	.57	.96
E12	.73	.96	E28	.61	.96
E13	.70	.96	E29	.76	.96
E14	.77	.96	E30	.74	.96
E15	.45	.96	E31	.77	.96
E16	.55	.96	E32	.70	.96

Table 14. Summary Item Analysis Statistics for LEDES – Distress

Cronbach alpha: .97, Standardized alpha: .97

Average inter-item correlation: .72 (n= 402).

Item #	Item-Total Correlation	Alpha if deleted	Item #	Item-Total Correlation	Alpha if deleted
D1	.69	.97	D17	.56	.97
D2	.81	.97	D18	.61	.97
D3	.62	.97	D19	.40	.97
D4	.84	.97	D20	.80	.97
D5	.74	.97	D21	.76	.97

Table 14 (cont.)

Item #	Item-Total Correlation	Alpha if deleted	Item #	Item-Total Correlation	Alpha if deleted
D6	.52	.97	D22	.61	.97
D7	.75	.97	D23	.65	.97
D8	.83	.97	D24	.78	.97
D9	.53	.97	D25	.84	.97
D10	.77	.97	D26	.81	.97
D11	.76	.97	D27	.83	.97
D12	.78	.97	D28	.74	.97
D13	.74	.97	D29	.65	.97
D14	.82	.97	D30	.70	.97
D15	.69	.97	D31	.80	.97
D16	.81	.97	D32	.78	.97

Target Study: Validation of the LEDS

The next step was to determine whether the data is fit for use in an Exploratory Factor Analysis (EFA) using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Field et al., 2012). The overall measure of adequacy of this target sample is 0.966 for eustress and 0.970 for distress, which qualify as ‘marvelous’ (Kaiser & Rice, 1974) or ‘superb’ (Hutcheson & Sofroniou, 1999).

When interpreted together, these measures suggest that the sample size is adequate to conduct EFA analysis (Williams et al., 2010). Bartlett’s test was also conducted and was found to be highly significant, $\chi^2(1, 496) = 8828.38, p < .001$, for eustress and $\chi^2(1, 496) = 11280.56, p < .001$, which also indicates the data sets are appropriate for conducting an EFA (Field et al., 2012).

For this study, a common factor analysis approach was chosen to conduct an Exploratory Factor Analysis (EFA: Finch & French, 2015; Warner, 2008). Although common factor analysis and principal components analysis often lead to similar results, they rely on different conceptual and mathematical assumptions (Field et al., 2012). According to Finch and French (2015), principal components analysis's limitation is that it assumes that the "indicators are measured without error (i.e., they have perfect reliability; p. 33)." This means that principal components analysis essentially pretends that researchers can predict all of the variance in each item from the rest of the items. Because it is unlikely that a scale can capture the totality of the variance, this assumption of perfect reliability is not a strong assumption (Fabrigar et al., 1999).

On the other hand, the common factor analysis recognizes that a measure cannot capture the totality of the variance (Finch & French, 2015). This approach suggests that the variance comes from different sources such as common variance, unique variance, and error variance (Beavers et al., 2013; Carpenter, 2018). While principal components analysis is a sound approach for data reduction, Finch and French (2015, p. 33) indicate that a common factor analysis is a better approach if a researcher also wants to "identify a latent structure that is directly tied to theory." As DeVellis's guideline gave a central place for theory in the process of scale development, this is a crucial point, and therefore a common factor analysis was used for this study.

Following the common factor analysis approach, maximum likelihood (ML) factoring was conducted via Mplus version 8.5. The 32 + 32 (64) items with acceptable reliabilities were first screened. The means and standard deviations of these items (see Table 15) were all considered acceptable (no extreme means, sufficient variability) and were therefore included in the common factor analysis.

Table 15. Descriptive Summary for LEDS items used for ML Analysis

Item # (eus)	Mean	SD	Item # (dis)	Mean	SD
E1	2.29	1.04	D1	2.39	1.19
E2	2.34	1.08	D2	2.32	1.22
E3	2.32	1.08	D3	2.23	1.19
E4	2.36	1.18	D4	2.39	1.24
E5	2.53	1.09	D5	2.47	1.17
E6	2.01	.89	D6	1.97	.98
E7	2.32	.98	D7	2.21	1.11
E8	2.16	1.04	D8	2.21	1.16
E9	1.52	.93	D9	1.57	1.00
E10	2.08	1.03	D10	2.17	1.15
E11	1.96	1.14	D11	2.07	1.23
E12	1.91	1.01	D12	1.96	1.10
E13	2.08	1.05	D13	2.19	1.16
E14	2.20	1.13	D14	2.27	1.26
E15	2.40	.96	D15	2.35	1.09
E16	1.82	.95	D16	1.82	1.02
E17	2.08	1.06	D17	2.16	1.09
E18	2.12	1.09	D18	2.26	1.15
E19	1.85	1.04	D19	1.88	1.09
E20	1.87	1.00	D20	1.91	1.09
E21	1.96	.97	D21	2.09	1.11
E22	1.83	1.06	D22	1.95	1.16
E23	2.08	1.17	D23	2.24	1.25
E24	2.25	1.05	D24	2.28	1.10
E25	2.08	1.04	D25	2.20	1.15
E26	1.93	1.07	D26	2.00	1.14
E27	2.05	1.04	D27	2.10	1.12
E28	2.04	.92	D28	2.08	1.02

Table 15 (cont.)

Item # (eus)	Mean	SD	Item # (dis)	Mean	SD
E29	2.19	1.09	D29	2.29	1.22
E30	2.45	.98	D30	2.48	1.10
E31	2.18	1.02	D31	2.28	1.12
E32	1.68	1.01	D32	1.77	1.11

Determining the Number of Factors to Retain

As discussed in Chapter 3, three methods were used as the basis for determining the number of factors to be retained: 1) Kaiser’s criterion, 2) the scree plot test, and 3) the interpretability of the factor solution.

First, the eigenvalues in the table of total variance were examined. An eigenvalue is defined as the amount of total variance explained by each factor. Table 16 identifies the four factors for eustress and three factors for distress with eigenvalues which met Kaiser’s criterion (i.e., values greater than 1). The four factors of eustress accounted for approximately 62% of the total variance and the three factors of distress accounted for approximately 65% of the variance.

Table 16. Initial Eigenvalues and Percentage of Variance Explained by each factor

Eustress

Factor	Total Eigenvalue	% of Variance	Cumulative %
1	15.45	48.28	48.28
2	1.96	6.13	54.41
3	1.19	3.71	58.12
4	1.09	3.41	61.53

Table 16 (cont.)

Distress

Factor	Total Eigenvalue	% of Variance	Cumulative %
1	17.78	55.57	55.57
2	2.01	6.27	61.84
3	1.01	3.14	64.98

Next, examination of the graphical scree plots of each eigenvalue (i.e., vertical axis) plotted against their ordinal number (i.e., horizontal axis) was used. The scree plot rule recommends retaining all factors before the sharp descent of the plot, or just before eigenvalues level off. As shown below on Figure 6 and 7, the scree plot substantially levels off after the second and third components. Consequently, retaining three factors for eustress and two factors for distress was considered.

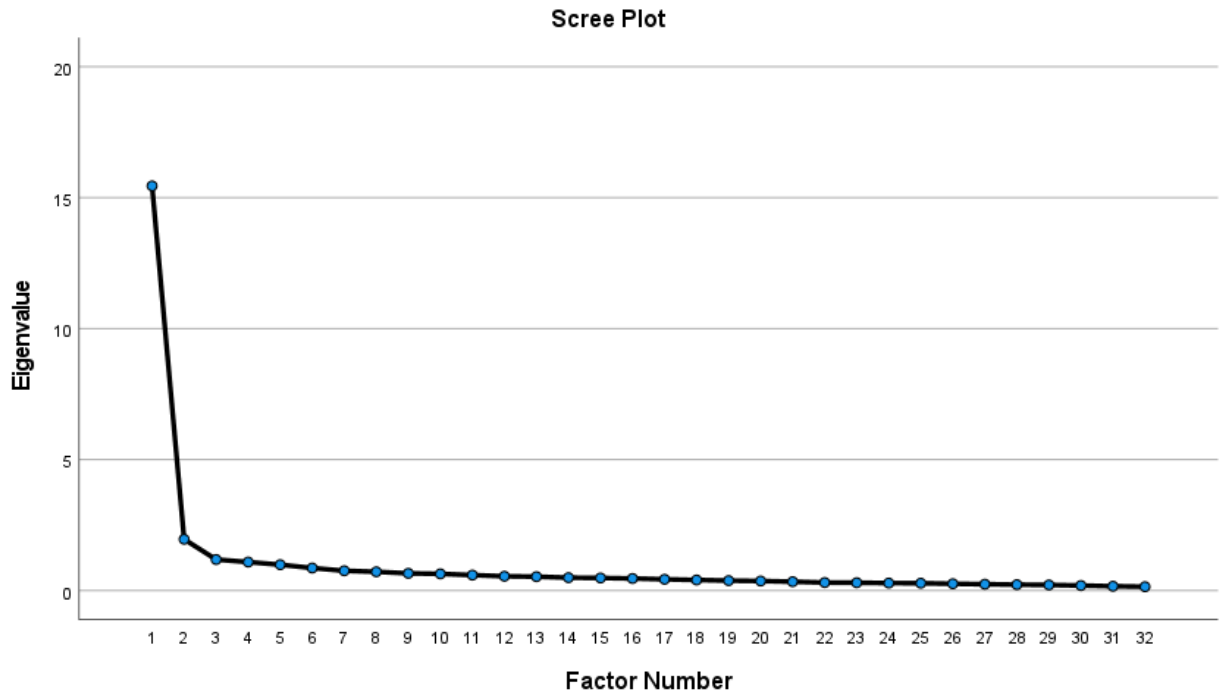


Figure 6. Scree Plots – Eustress

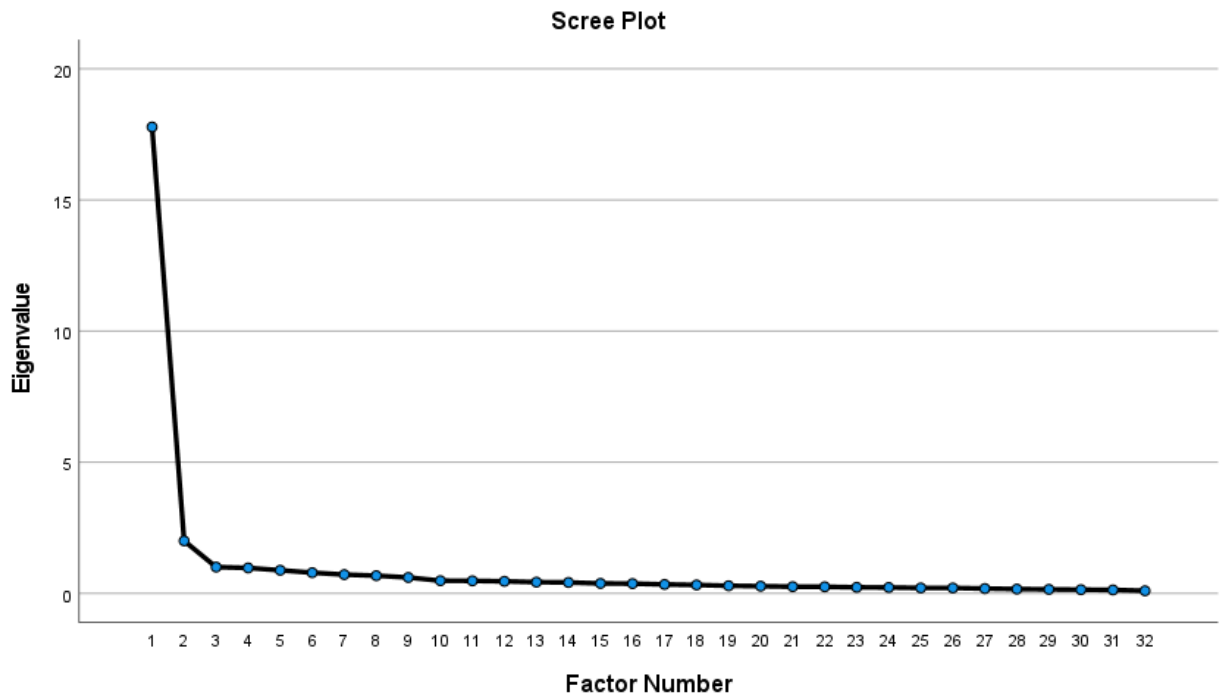


Figure 7. Scree Plots - Distress

The number of factors to be retained is determined by a combination of finding the point of inflection in the scree plot and selecting a solution whose eigenvalues are above 1 (Finch & French, 2015). According to Stevens (1992), Kaiser's rule is more reliable when the number of variables is less than 30 and the communalities are lower than .70 or when the sample size is less than 250 and the mean communality is lower than .60. The scree plot rule is considered to be more reliable when the number of participants is greater than 250 and communalities are somewhat large ($>.30$). Based on the target sample size in this study ($N=402$), the 32 variables used, and the range of communalities from the maximum likelihood analysis, there was greater support for using the scree plot test. Several factor solutions using maximum likelihood analysis with varimax rotation were compared to determine which resulted in the most meaningful and interpretable solution. This analysis and its interpretation suggest that a three-factor solution is the preferred option for the eustress and a two-factor solution for the distress scale.

Factor Rotation

While there are a variety of factor rotation options, the overall goal of those strategies is in obtaining a clear pattern of loadings (i.e., factors) that are somehow clearly marked by high loadings for some variables and low loadings for others. Orthogonal rotational strategies were examined to help determine which items were retained for the most meaningful factor solution. Specifically, maximum likelihood analysis with varimax normalized rotation was used to evaluate orthogonal factors.

Determining the Number of Items to Retain

Results from both maximum likelihood analyses were used in conjunction with conceptual logic to determine which items were dropped or selected for each factor. Table 17

and 18 present the factor loadings and communalities of the 32 items after running a maximum likelihood analysis using varimax normalized rotation for both a three-factor solution for eustress and a two-factor solution for distress respectively. Each of factors and their respective items were examined by looking at their factor loadings and communality, complexity and uniqueness scores in the output of the EFA. Several items were deleted based on the objectives of enhancing the reliability of the scale and possessing an optimal number of items per factor (Carpenter, 2018). Items retained were selected on the basis of their loadings that required .45 or greater on one of the factors. Items with a communality lower than .4 were considered as candidates to be deleted. Applying these criteria suggested dropping 6 items (items #3,6,7,15,17,27) for a three-factor solution for eustress and 3 items (item #6,15,17) for a two-factor solution for distress. Combining the items suggested for dropping from both eustress and distress scales, a total of 6 items (items #3,6,7,15,17,27) were dropped from the LEDS.

Table 17. Factor Loadings and Communality for Eustress Items (** items considered for deletion)

Item	F1	F2	F3	Communality
E1	.64	.23	.10	.480
E2	.80	.16	.21	.711
E3**	.16	.37	.23	.217
E4	.68	.16	.37	.630
E5	.62	.22	.35	.556
E6**	.04	.42	.12	.196
E7**	.28	.41	.29	.334
E8	.49	.28	.56	.622
E9	.15	.64	.13	.443
E10	.58	.33	.34	.557
E11	.68	.37	.27	.678

Table 17 (cont.)

Item	F1	F2	F3	Communality
E12	.44	.44	.42	.559
E13	.33	.57	.35	.550
E14	.66	.22	.47	.711
E15**	.28	.35	.16	.223
E16	.22	.67	.11	.502
E17**	.20	.49	.26	.346
E18	.55	.33	.54	.702
E19	.36	.45	.47	.549
E20	.17	.56	.36	.475
E21	.29	.62	.16	.495
E22	.39	.47	.52	.646
E23	.60	.22	.61	.778
E24	.51	.31	.55	.664
E25	.52	.34	.59	.726
E26	.27	.48	.44	.500
E27**	.20	.37	.44	.370
E28	.12	.50	.47	.477
E29	.38	.29	.67	.685
E30	.39	.32	.59	.603
E31	.37	.37	.63	.668
E32	.36	.44	.44	.522

Table 18. Factor Loadings and Communality for Distress Items (**items considered for deletion)

Item	F1	F2	Communality
D1	.71	.24	.56
D2	.83	.28	.77
D3	.28	.65	.50
D4	.82	.35	.79

Table 18 (cont.)

Item	F1	F2	Communality
D5	.67	.37	.58
D6**	.19	.59	.38
D7	.48	.61	.61
D8	.71	.46	.72
D9	.16	.65	.45
D10	.72	.35	.64
D11	.77	.28	.67
D12	.61	.51	.63
D13	.46	.61	.58
D14	.86	.28	.81
D15**	.31	.51	.36
D16	.23	.70	.54
D17**	.29	.28	.17
D18	.73	.40	.69
D19	.57	.51	.59
D20	.28	.62	.47
D21	.35	.61	.50
D22	.57	.55	.63
D23	.85	.32	.82
D24	.71	.42	.68
D25	.79	.37	.76
D26	.51	.55	.56
D27	.44	.50	.44
D28	.35	.69	.59
D29	.69	.44	.67
D30	.60	.52	.63
D31	.61	.56	.68
D32	.54	.46	.50

Next, another maximum likelihood factoring was conducted with 26 items (excluding items #3,6,7,15,17,27) for each eustress and distress scale with a varimax rotation that specifies a three-factor solution for eustress and two-factor solution for distress. There were several cases in which the items had a slight cross-loading. For those items that were cross-loaded, data driven decisions were made, meaning the item was included in the dimension with higher loading value. Each item was examined to determine if it made conceptual sense with empirically derived factor. Item 12 (i.e., I worry I won't be able to meet the expectations of my leisure group) and item 32 (i.e., I feel discouraged because of my decreased cognitive ability) were given special attention due to its cross-loading and small loading value (< 0.45). Item 12 was retained since it maintained adequate breadth and conceptual fit with its factor, however item 32 was dropped since it had no conceptual fit with its factor. As a result, 7 items (6 items due to low communality and 1 item due to cross-loading/small loading value) were removed retaining 25 items for next step of analysis.

After decisions were made concerning which items to include or delete, the group of items for each empirically derived factor was rank-ordered based on the magnitude of their factor loadings. Table 19 presents the items selected for each of the three factors for eustress and two factors for distress. For eustress, the three factors explain 58.12 % of the variance. Items for each of the factors had positive factor loadings in the range of .41 and .80. For distress, the two factors explain 61.84% of variance, and the items for each of two factors had positive loadings in .53 and .86.

Table 19. Exploratory Factor Analysis: Item Loading for Every Factor of LEDS.

Items	Factor loadings				
	Eustress			Distress	
	F1	F2	F3	F1+F2	F3
1. I experience physical pain when participating in some leisure activities	.63	.14	.21	.73	.25
2. I am worried that ongoing health conditions may interfere with some of my leisure activities	.80	.21	.17	.83	.28
4. I feel discouraged because I am unable to do leisure activities as well as I used to do them	.68	.38	.15	.83	.34
5. Some leisure activities are too challenging for my skill level	.61	.37	.20	.70	.32
10. I worry about the possible risk of injury from engaging in leisure activities	.59	.33	.33	.72	.35
11. My injury interferes with my participation in leisure activities	.68	.27	.39	.75	.31
14. My decreased physical abilities affect my leisure engagement	.66	.48	.22	.86	.28
23. I feel discouraged because of my decreased physical abilities	.60	.60	.22	.85	.31
8. I don't have enough energy to participate in my leisure activities	.48	.56	.28	.72	.46
12. I worry I won't be able to meet the expectations of my leisure group	.44	.41	.46	.62	.50
18. I feel discouraged because I am fatigued from doing leisure activities	.55	.54	.32	.74	.38
19. I worry that people may judge me negatively since I have not done this activity in a long time	.36	.46	.46	.57	.52
22. I feel depressed and down, so I am not motivated to participate in leisure activities	.38	.54	.46	.58	.55

Table 19 (cont.)

Items	Factor loadings				
	Eustress			Distress	
	F1	F2	F3	F1+F2	F3
24. I feel some leisure activities are no longer fun and/or enjoyable	.52	.56	.29	.73	.39
25. I am concerned that I won't be able to do leisure activities well enough to participate	.52	.58	.34	.80	.35
26. I feel pressured to perform at a certain level while engaging in leisure activities	.27	.45	.48	.53	.53
29. Lately, I feel less motivated to participate in the leisure activity	.37	.70	.44	.70	.42
30. Sometimes, I am not in the mood to engage in leisure activities	.38	.62	.29	.62	.49
31. I want to do a leisure activity, but I just can't seem to get started on the activity	.36	.66	.34	.61	.55
9. I can't fully focus on leisure activities because I have caregiving responsibilities	.12	.14	.67	.14	.70
13. I need more time and effort to learn and practice new leisure activities	.33	.36	.54	.48	.57
16. I am overloaded with many obligations, so I have less time to participate in leisure activities	.18	.16	.68	.21	.74
20. There aren't any available leisure opportunities or programs near me	.17	.38	.54	.30	.60
21. Sudden and unexpected responsibilities and/or demands can prevent me from participating in leisure activities	.26	.20	.63	.34	.60
28. I engage in leisure activities, but I still feel a bit bored when I do some of them	.12	.50	.44	.38	.64

Note. N= 402, Factor loadings of items grouped under each specific factor are marked in bold.

Factor Interpretation

The next step was to interpret and name each dimension. This was accomplished by considering items with respect to loading strength and identifying the underlying and overlapping concept of variables that comprised each empirically derived dimension.

Eustress Factors. The first dimension (factor) of eustress scale consisted of 8 of 25 items. These items addressed stressors related to physical pain, ongoing health conditions, injury, and physical ability in the context of leisure. As the common theme of this first dimension is related to physical aspects of eustress, the first factor was called physical related stressor and labeled 'physical.' Item number 4 can be interpreted as older adults not being able to do leisure activities as well as they used to due to decreased physical ability. Going back to the qualitative data from Phase 1 study, older adults mostly referred to physical aspects being their main reasons for the decreased skills or lowering the level of difficulty/intensity. That rationale also covers item number 5 as well. Also, the factor loading values suggest that those two items fall under the first dimension (i.e., physical).

The second dimension consisted of 11 of 25 items. These items addressed stressors related to worries about not meeting expectations (others and myself), feeling concerned and pressured, and lack of motivation in the context of leisure. As the common theme of this second dimension is related to psychological aspects (i.e., interpretation of feelings and motivation), the second factor was called psychological related stressor and labeled 'psychological.' Item number 8 which refers to not having enough energy to participate and number 18 which refers to feeling discouraged because one is fatigued from doing leisure activities are included in the second factor as well. Both items indicate challenges faced due to low energy and how older adults are demotivated and discouraged to participate in leisure activities. Going back to the data from

phase 1 study, there was a difference between how older adults felt stress from not being able to engage at all or faced with decreased skills/abilities due to their changed/decreased physical abilities and how they experienced low energy, so they are demotivated to participate. Therefore, item number 18 which was double-loaded, was sent to factor 2 (psychological) instead of factor 1 (physical) along with item number 8 which has adequate factor loading value for factor 2.

The third dimension consisted of 6 of 25 items. These items addressed stressors that are related to caregiving and/or sudden/unexpected responsibilities and not having available time or opportunities/programs to participate in leisure activities. As the common theme of this third dimension is related to environmental factors that cause stress to older adults in the context of leisure, the third factor was called environmental stressors and labeled 'environmental.' Item number 28 (i.e., I engage in leisure activities, but I still feel a bit bored when I do some of them) was included in this third dimension because older adults' experience of boredom was considered a broader issue than just one's psychological response, but more of an environmental or structural problem based on the data that emerged from the Phase 1 study. The Phase 1 study findings indicated that older adults especially with ongoing health conditions or those who have recently experienced loss of spouse/friend were experiencing a chronic boredom where they were surrounded by barriers (e.g., no transportation, health issues) and isolation (e.g., not having social support). Therefore, this item seemed to fit better with the environmental factor rather than the psychological factor. Boredom is a real issue among older adults, and it is not just an individual one but more of an environmental/structural issue that seriously disconnects older adults from engaging in leisure activities.

Distress Factors. The first dimension of the distress scale consisted of 19 of 25 items. This dimension is a combination of factor 1 (physical) and factor 2 (psychological) of the

eustress scale, therefore it is labeled ‘physical and psychological.’ Item number 26 was cross loaded; however, it was included in the first dimension of distress based on author’s interpretation of the item.

The second dimension of the distress scale consisted of 6 of 25 items. This dimension is the same as factor 3 (environmental) for eustress, therefore it is labeled as ‘environmental.’ All factor loading values were significant, and it had no cross-loadings.

Summary. LEDS – Eustress ended up having 3 factors (i.e., physical, psychological, and environmental) and LEDS – Distress had 2 factors (i.e., physical + psychological and environmental). This is an interesting result because it suggests that when older adults perceive or appraise eustress, they look at three different dimensions. However, when they perceive or appraise distress, instead of distinguishing physical and psychological, they perceive them together and only distinguish environmental factor. Older adults’ experience of eustress is more specifically driven from their physical, psychological, and environmental dimensions whereas their experience of distress was driven from either a stressor coming from themselves (i.e., physical and psychological) or stressor coming from elsewhere that they have less control over (i.e., environmental).

Studying the Measurement Properties of Factor-based Subscales

Next, Cronbach’s (1951) alpha and the average inter-item correlation were assessed to evaluate how internally consistent and correlated the items were within each empirically derived factor. This provided for a measurement of the internal reliability or internal consistency reliability (ICR) among items in the scale. For factor-based subscales derived from the exploratory factor analysis, the goal was to have subscale ICRs in the range of .80 to .90 and adequate (.3 to .4) inter-item correlations. As shown in Table 20, all the factors both for eustress

and distress showed adequate ICRs ($\alpha > .80$). Average inter-item correlations were moderately positive (.4 to .7).

Table 20. Internal Consistency Reliability of Factors of LEDS

	Factor	# of Items	Cronbach alpha	Average inter-item correlation
Eustress	Factor 1: Physical	8	.93	.60
	Factor 2: Psychological	11	.95	.61
	Factor 3: Environmental	6	.84	.46
Distress	Factor 1: Physical + Psychological	19	.97	.66
	Factor 2: Environmental	6	.87	.52

While the nature of the factors is largely congruent with findings from the literature of leisure and stress among older adults, reliability is also checked to grasp the internal consistency of the LEDS (Revelle & Condon, 2018). Cronbach’s alphas coefficients for the three factors ranged between .84 and .95 for eustress and .87 and .96 for distress, which is above the recommended threshold of .70 (Field et al., 2012).

Confirmatory Factor Analysis

The results obtained through EFA were then subjected to confirmatory factor analysis (CFA). The models tested for the appraisal of both eustress and distress included a three-factor structure for eustress found in our analysis allowing the three factors to correlate and a two-factor structure for distress allowing the two factors to correlate. The statistical program Mplus was used to perform the analysis. With the aim of assessing the fit of the models, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and standardized root

mean square residual (SRMR) were used. The suggested guideline's cutoff values for the RMSEA is .05 to .08 to indicate acceptable fit of the model and if the RMSEA is greater than .1, it indicates poor fit (Byrne, 2013). For CFI, less than .95 and for the SRMR, less than .08 are considered thresholds of a good model fit (Hu & Bentler, 1999).

A model without measurement error correlation was tested and then a model with measurement error correlations was examined. Both models were conducted with a congeneric model. That is, all items were exclusively loaded onto their corresponding latent factors with no common factor loadings (Byrne, 2013). As seen in Table 21, the model for eustress without measurement error correlation showed goodness-of-fit statistics, with RMSEA lower than .08, CFI lower than .96, and SRMR satisfying the criterion of .08. However, the model for distress without measurement error correlation showed a barely acceptable model fit. In order to improve the model fit, the following pairs of measurement error were correlated in the measurement model: item D30 and D31, item D9 and D16, item D19 and D12, item D25 and D24, item D1 and D2, item D2 and D14, item D12 and D26, item D19 and D26, item D22 and D29, item D11 and D18, item D23 and D31 (see figure 9). After adding these correlations, the model showed a good model fit (Table 21).

Although the chi-square test of model fit was still significant, indicating the model predictions were significantly different from observations, all other indicators demonstrated a reasonably good model fit. Given that the chi-square fit statistic is affected by large sample size, using multiple fit indices provides more holistic view of goodness of fit, accounting for sample size, model complexity and other considerations relevant to the particular study (Alavi et al., 2020). In practice, the chi-square test is "not always the final word in assessing fit" (West et al.,

2012, p. 211). Therefore, Kline (2005) suggests that combination of chi-square, RMSEA, CFI, and SRMR should be assessed and reported.

Table 21. Fit Indices for Measurement Models for Eustress and Distress (n=402)

Model	χ^2	<i>df</i>	RMSEA (90% CI)	CFI	SRMR
Eustress	941.74 (p < .0)	272	.078 (CI = .073 - .084)	.910	.046
Distress	947.98 (p < .0)	263	.080 (CI = .075 - .086)	.927	.046

In both models for eustress without measurement error correlations and model for distress with measurement error correlations, all factor loadings were significant (p <.001) and further indicated strong correlations between items and latent factors (See Table 22 for eustress and Table 23 for distress). In the model for eustress, 25 items explain 57% of the variance. The 8 items #1,2,4,5,10,11,14, and 23 were loaded onto the physical factor (60%), the 11 items #8,12,18,19, 22,24,25,26,29,30, and 31 were loaded onto the psychological factor (61%). The 6 items # 9,13,16,20, 21, and 28 were loaded onto the environmental factor (46%). As for the model for distress, 25 items explained 62 % of the variance. The 19 items #1,2,4,5, 8, 10,11,12, 14, 18, 19, 22, 23, 24, 25, 26, 29, 30, and 31 were loaded onto the physical + psychological factor (66%). The 6 items # 9,13,16,20, 21, and 28 were loaded onto the environmental factor (50%).

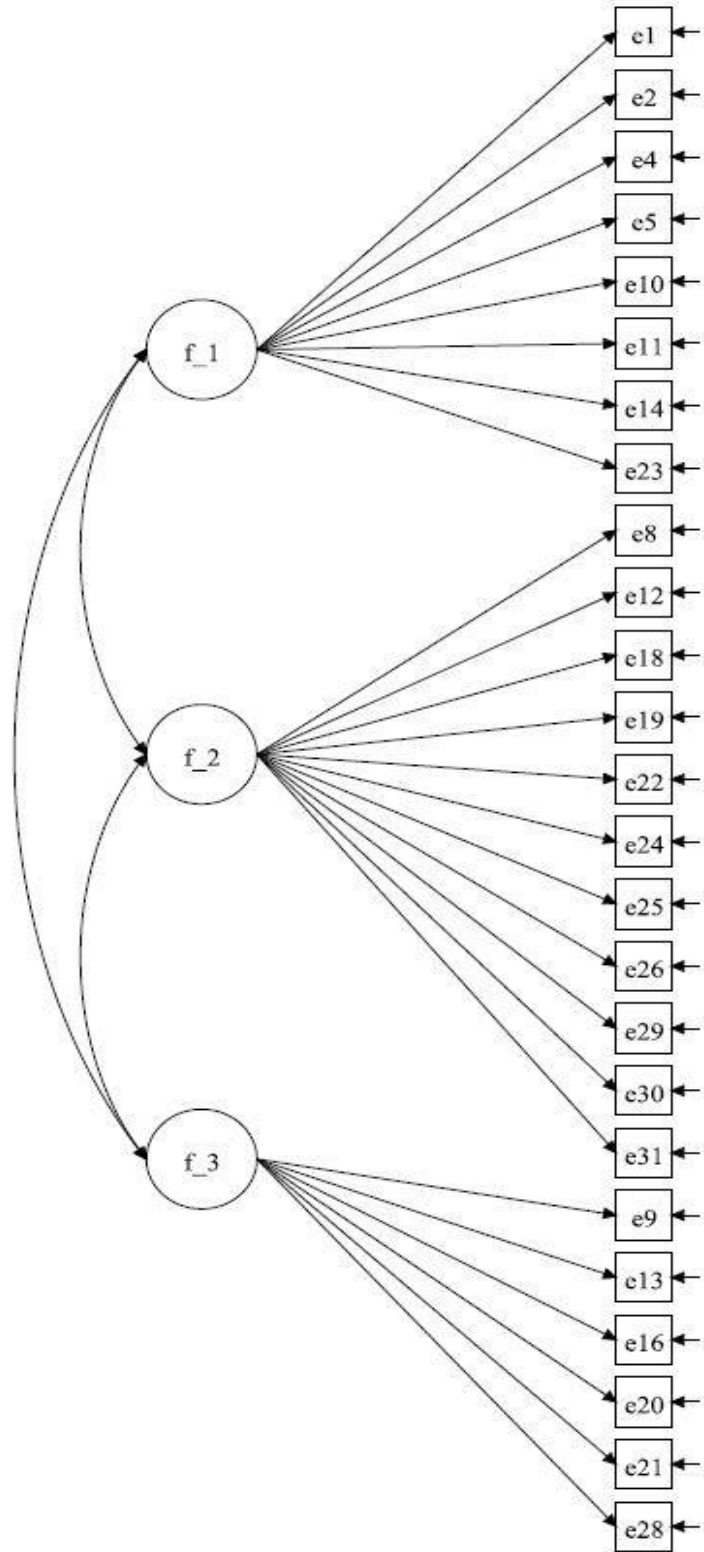


Figure 8. CFA of LEDS-Eustress

Table 22. Results from the Confirmatory Analysis for LEDS – E (Eustress)

Factors/Items	Factor Loading	S.E
Factor 1: Physical (AVE=.60)		
E1. I experience physical pain when participating in some leisure activities	.62	.03
E2. I am worried that ongoing health conditions may interfere with some of my leisure activities	.77	.02
E4. I feel discouraged because I am unable to do leisure activities as well as I used to do them	.79	.02
E5. Some leisure activities are too challenging for my skill level	.74	.02
E10. I worry about the possible risk of injury from engaging in leisure activities	.74	.02
E11. My injury interferes with my participation in leisure activities	.80	.02
E14. My decreased physical abilities affect my leisure engagement	.84	.02
E23. I feel discouraged because of my decreased physical abilities	.97	.01
Factor 2: Psychological (AVE=.61)		
E8. I don't have enough energy to participate in my leisure activities	.78	.02
E12. I worry I won't be able to meet the expectations of my leisure group	.75	.02
E18. I feel discouraged because I am fatigued from doing leisure activities	.84	.02
E19. I worry that people may judge me negatively since I have not done this activity in a long time	.74	.02
E22. I feel depressed and down, so I am not motivated to participate in leisure activities	.79	.02
E24. I feel some leisure activities are no longer fun and/or enjoyable	.81	.02
E25. I am concerned that I won't be able to do leisure activities well enough to participate	.86	.01

Table 22 (cont.)

Factors/Items	Factor Loading	S.E
E26. I feel pressured to perform at a certain level while engaging in leisure activities	.68	.03
E29. Lately, I feel less motivated to participate in the leisure activity	.80	.02
E30. Sometimes, I am not in the mood to engage in leisure activities	.76	.02
E31. I want to do a leisure activity, but I just can't seem to get started on the activity	.80	.02
Factor 3: Environmental (AVE=.46)		
E9. I can't fully focus on leisure activities because I have caregiving responsibilities	.61	.04
E13. I need more time and effort to learn and practice new leisure activities	.74	.03
E16. I am overloaded with many obligations, so I have less time to participate in leisure activities	.66	.03
E20. There aren't any available leisure opportunities or programs near me	.70	.03
E21. Sudden and unexpected responsibilities and/or demands can prevent me from participating in leisure activities	.69	.03
E28. I engage in leisure activities, but I still feel a bit bored when I do some of them	.66	.03

Note: All estimates are significant at the level of $p < .0001$

AVE = average variance extracted

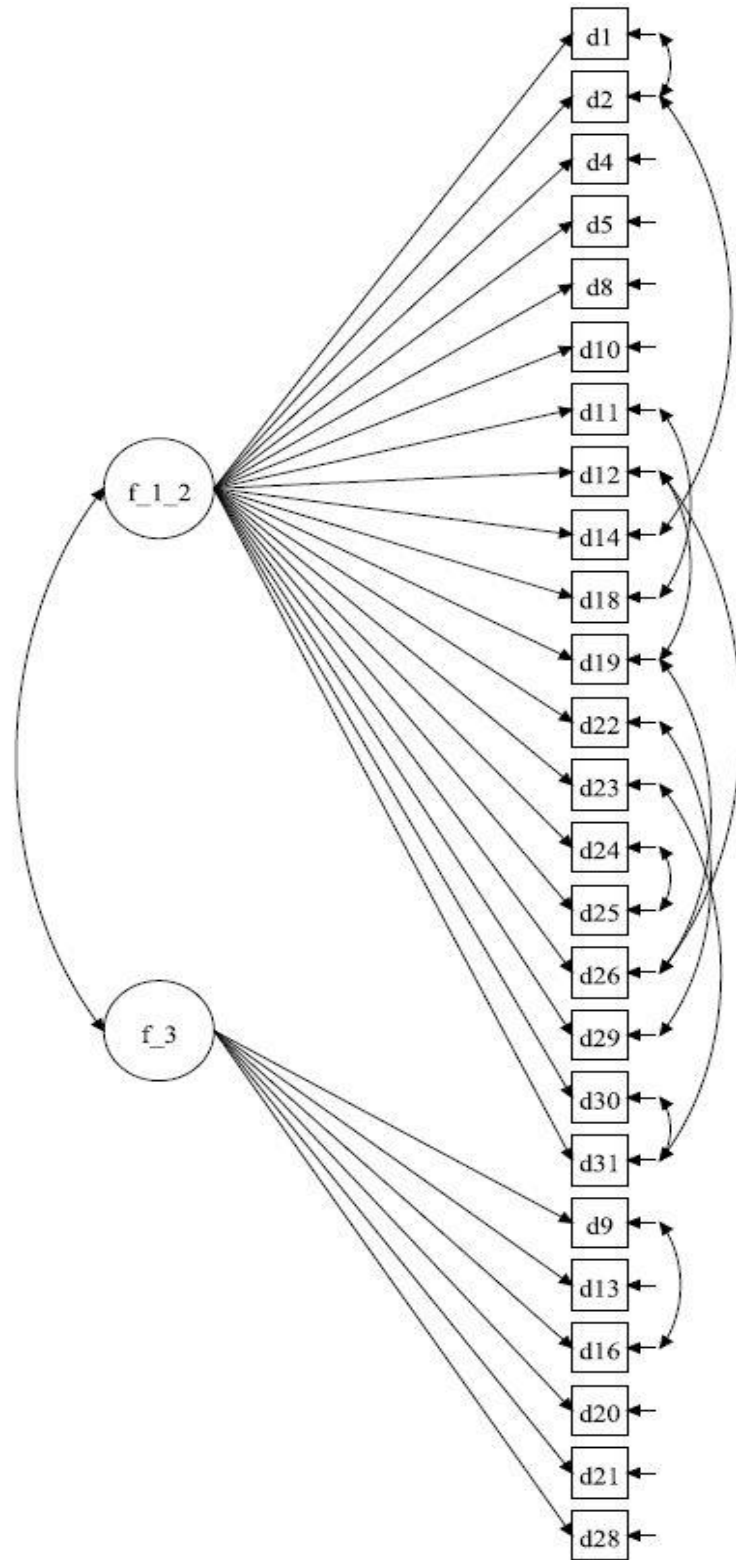


Figure 9. CFA of LED5 – Distress

Table 23. Results from the Confirmatory Analysis for LEDSD – D (Distress)

Factors/Items	Factor Loading	S.E
Factor 1+2: Physical + Psychological (AVE=.66)		
D1. I experience physical pain when participating in some leisure activities	.73	.02
D2. I am worried that ongoing health conditions may interfere with some of my leisure activities	.86	.01
D4. I feel discouraged because I am unable to do leisure activities as well as I used to do them	.89	.01
D5. Some leisure activities are too challenging for my skill level	.76	.02
D8. I don't have enough energy to participate in my leisure activities	.85	.02
D10. I worry about the possible risk of injury from engaging in leisure activities	.80	.02
D11. My injury interferes with my participation in leisure activities	.81	.02
D12. I worry I won't be able to meet the expectations of my leisure group	.77	.02
D14. My decreased physical abilities affect my leisure engagement	.88	.01
D18. I feel discouraged because I am fatigued from doing leisure activities	.84	.02
D19. I worry that people may judge me negatively since I have not done this activity in a long time	.74	.02
D22. I feel depressed and down, so I am not motivated to participate in leisure activities	.76	.02
D23. I feel discouraged because of my decreased physical abilities	.90	.01
D24. I feel some leisure activities are no longer fun and/or enjoyable	.82	.02
D25. I am concerned that I won't be able to do leisure activities well enough to participate	.87	.01

Table 23 (cont.)

Factors/Items	Factor Loading	S.E
D26. I feel pressured to perform at a certain level while engaging in leisure activities	.70	.03
D29. Lately, I feel less motivated to participate in the leisure activity	.82	.02
D30. Sometimes, I am not in the mood to engage in leisure activities	.77	.02
D31. I want to do a leisure activity, but I just can't seem to get started on the activity	.81	.02
Factor 3: Environmental (AVE=.50)		
D9. I can't fully focus on leisure activities because I have caregiving responsibilities	.60	.04
D13. I need more time and effort to learn and practice new leisure activities	.78	.02
D16. I am overloaded with many obligations, so I have less time to participate in leisure activities	.71	.03
D20. There aren't any available leisure opportunities or programs near me	.66	.03
D21. Sudden and unexpected responsibilities and/or demands can prevent me from participating in leisure activities	.75	.03
D28. I engage in leisure activities, but I still feel a bit bored when I do some of them	.74	.03

Note: All estimates are significant at the level of $p < .0001$
 AVE = average variance extracted

Construct Validity

Convergent and discriminant validity. Convergent validity was assessed by examining whether the average variance extracted (AVE) is above .50 (Fornell & Larcker, 1981). Most of

the LEDS factors have AVEs that are above this recommended threshold, suggesting that this scale has good convergent validity (see Tables 24 & 25).

Table 24. Convergent and Discriminant Validity for LEDS - E (Eustress)

	1	2	3
Factor 1: Physical	<i>.602</i>	.863	.514
Factor 2: Psychological	.929	<i>.458</i>	.721
Factor 3: Environmental	.717	.849	<i>.614</i>

Note. AVEs are located in the italicized diagonal; squared correlations are in the top half of the matrix, and correlations are in lower half of the matrix.

Table 25. Convergent and Discriminant Validity for LEDS - D (Distress)

	1+2	3
Factor 1+2: Physical + Psychological	<i>.657</i>	.667
Factor 3: Environmental	.817	<i>.504</i>

Note. AVEs are located in the italicized diagonal; squared correlations are in the top half of the matrix, and correlations are in lower half of the matrix.

Discriminant validity is tested by looking at whether the AVE values are higher than the squared correlation between the dimensions (Farrell & Rudd, 2009). In order to achieve good discriminant validity, all of the AVE values should be higher than their respective set of squared correlations. However, as shown in Tables 24 and 25, discriminant validity of both eustress and distress was not achieved.

Criterion Validity

Concurrent validity. In the present study, the reworded adolescent distress-eustress scale (ADES) was chosen to test concurrent validity. Based on the literature, it was postulated that the correlation between ADES and LEDS would be positive but would not necessarily

strong. If this was the case, it would mean the two measures were essentially capturing the same thing, that the newly developed scale does not bring anything new to the nomological network, and the new scale was simply a reiteration of what was already present in the literature (Podsakoff et al., 2016). Thus, it was expected that the two scales would correlate somewhat but the correlation would not be too strong (would be a moderate positive correlation (.3 to .7). The factor scores for LEDS from EFA and the composite score (average of each dimension) from ADES were used to compute the correlation between those factors (Table 26).

Table 26. Concurrent Validity (EFA version)

	LEDS E1: Physical	LEDS E2: Psychological	LEDS E3: Environmental	LEDS D1+2: Physical + Psychological	LEDS D3: Environmental
ADES E	-.09	-.23***	.07	-.27***	-.11*
ADES D	-.28***	-.35***	.43***	.43***	.51***

Note: *** $p < .0001$, * $p < .05$ level.

The correlation analyses are low (below .3) or negative between ADES-eustress and LEDS-eustress factors 2 ($r = -.23$, $p < .0001$), LEDS-distress factor 1+2 ($r = -.27$, $p < .0001$) and LEDS-distress factor 3 ($r = -.11$, $p < .0001$). There is no significant relationship between AEDS-eustress and LEDS - Eustress factor 1 and 3. Based on these results, it is hard to say LEDS-Eustress scale has a good concurrent validity. In comparison, there is moderate positive correlation between ADES-distress and LEDS-distress Factor 1+2 ($r = .43$, $p < .001$), LEDS-distress Factor 3 ($r = .51$, $p < .001$), suggesting an overall acceptable concurrent validity.

Predictive validity. Lastly, predictive validity was assessed by investigating whether scores on the LEDS can predict scores on the Leisure Satisfaction scale. A series of single linear regressions were calculated to predict leisure satisfaction based on the LEDS factors (Table 27).

Specifically, a significant regression equation to predict leisure satisfaction based on LEDSEustress psychological factor was found ($F(1,400) = 43.133, p < .001$), with an R^2 of .097, indicating about 10% of the variance in leisure satisfaction was accounted for by the psychological eustress LEDSEustress factor. Participants' predicted leisure satisfaction decreased .312 for each unit of LEDSEustress factor 2. Also participants' predicted leisure satisfaction decreased .269 for each unit of each LEDSEdistress factor 1+2 ($F(1,400) = 31.288, p < .001, R^2 = .070$). Lastly, total leisure satisfaction decreased .115 for each unit of LEDSEdistress environmental factor ($F(1,400) = 5.401, p < .001, R^2 = .011$) however it should be noted that this accounted for a small amount of explained variance. Standardized coefficients of single linear regression between factors of LEDSE as independent and overall and its dimensions of leisure satisfaction as dependent variable are presented in Table 27.

Table 27. Predictive Validity of LEDSE factors on Leisure Satisfaction

	LS1 (Psyc)	LS 2 (Edu)	LS 3 (Soci)	LS 4 (Relax)	LS 5 (Phy)	LS 6 (Aes)	LS Total
LEDSE1: Physical	-.065	-.045	-.068	-.037	-.073	-.012	-.065
LEDSE2: Psychological	-.330***	-.209***	-.270***	-.234***	-.108*	-.205** *	-.312** *
LEDSE3: Environmental	.010	.199***	.073	-.105*	.083	-.016	.043
LEDSE D1+2: Physical + Psychological	-.304***	-.220***	-.228***	-.185***	-.090	-.127*	-.269** *
LEDSE 3: Environmental	-.146**	.062	-.082	-.217***	-.004	-.131**	-.115*

Note. Standardized coefficients are presented. $p < .001$ ***, $p < .01$ **, $p < .05$ *

This chapter presented the results of the development and initial validation of the LEDS using pilot and target samples. Results of the interview, panel of experts, pilot study, internal consistency, reliability, and inter-item statistics were used to develop and select items for the scale. A common factor analysis approach supported a three-factor solution for eustress and two-factor solution for the distress scale. The three empirically derived factor-based dimensions were labeled, 1) physical, 2) psychological, and 3) environmental for eustress and 1) physical + psychological and 2) environmental for distress. Using RMSEA, CFI, and SRMR from the CFA, both the model for eustress (without measurement error correlations) and distress (with measurement error correlations) had found all factor loadings to be significant ($p < .001$) and further indicated significant correlations between items and latent factors. Convergent, discriminant, concurrent, and predictive validity were checked, and some significant findings were shown in LEDS validity, however discriminant validity and LEDS – Eustress scale's concurrent validity were not found. More explanation about this is discussed in the next chapter. Chapter five includes the discussion of the findings, limitations, future research, and conclusion of these findings.

CHAPTER 5: DISCUSSION

The ultimate goal of this dissertation was to contribute to an understanding of how older adults perceive their leisure related stressors from the process of developing a measurement scale for both eustress and distress. After a thorough review of the research literature and stress theories, older adults' experience of eustress/distress in the context of leisure were estimated to occur before, during, and after engaging in leisure activities. Also, components for leisure related eustress and distress were proposed using a leisure constraints model with three dimensions: intrapersonal, interpersonal, and structural. Because there is not a thorough line of research on eustress and leisure, those guidelines were used to assume the direction and design of the study. However, as the study took place and both qualitative and quantitative data along with the suggestions from the expert panelists were gathered and analyzed, changes were made from the initial plan. This involved placing more weight on the empirical data to gain an understanding of leisure related eustress-distress and developing the Leisure Eustress-Distress Scale (LEDS) rather than the initially planned design. This is because the LEDS was mainly developed from the qualitative data that emerged from the in-depth interviews. Also, firmly established theory on leisure eustress-distress does not yet exist, therefore it made more sense to develop LEDS based on the direction where the data pointed. In this chapter, further interpretation of the results, especially the findings that were changed from the initial plan will be discussed and explained to better understand LEDS. Following the discussion of findings, limitations and future research are presented.

Interpretation and Discussion of Results

Leisure Related Stress and Leisure Constraints

Leisure eustress and distress. Initially, leisure related eustress-distress was conceptualized to capture older adults' response to stressors that could occur before, during, and after engaging in leisure activities. Therefore, qualitative data from the interviews included possible stressors that older adults faced before and after engaging in leisure in addition to what they experience while engaging in leisure activities. When all of those themes were developed into items and reviewed by the expert panelists, one of the experts (Dr. Doug Kleiber) suggested removing all items that included stressors that older adults face before engaging in leisure activities. This expert panelist had a legitimate point because the items suggested for removal were very similar with items from the leisure constraints scale (Raymore et al., 1993).

Although leisure constraints and stress coping models have some similarities (i.e., process oriented: Henderson & Bialeschki, 1993 and multi-phase iterative appraisal and coping process: Schneider & Stanis, 2007), the concept of constraints had to be distinguished from the concept of a stressor. Constraints refer to factors that limit/prohibit the formation of leisure preference or engagement (Crawford & Godbey, 1987; Jackson, 1997), whereas a stressor is more related to what a person would feel *during the experience*. The term 'stressor' by definition can encompass or overlap with constraints, however, considering the theoretical background of eustress (i.e., optimal arousal theory: Hull, 1943, Yerkes-Dodson law: Hebb, 1955, and flow theory: Csikszentmihalyi, 1975), it is evident that an important aspect of understanding one's experience of eustress and distress might come from an individual's level of arousal, emotions, and/or feelings. Therefore, in order to avoid overlapping items with the leisure constraints scale and to more accurately capture a person's experience of leisure related eustress-distress (i.e.,

feelings and emotional response that arises from leisure activities), a decision was made to focus on items (situations) that capture older adults' actual experience of eustress-distress while engaging in leisure activities.

Construct components to be measured. Because leisure constraints may be closely related with stress coping in terms of how constraints/stressors are interpreted in conceptual models, three components that distinguish how leisure constraints are experienced by individuals (i.e., intrapersonal, interpersonal, and structural) were used as a guideline to conceptualize, draft, and distinguish possible items for LEDS. However, the data and the results of the EFA suggested different factors for LEDS (i.e., physical, psychological, and environmental). Those three factors conceptually arise from the body of literature that supports how each component is heavily associated with stress among older adults in the context of leisure.

Early leisure scholars who began to conceptualize the relationship between leisure and stress (Coleman & Iso-Ahola, 1993) suggested that leisure-generated social support and self-determination dispositions buffer the relationships between level of stress and mental and physical health. Engaging in leisure activities allows one's intrinsic motivation, perceived freedom, and self-determination to increase which positively affects physical and mental health and was associated with better stress coping. Building on these earlier conceptualizations of leisure and stress, Iwasaki and his colleagues (Iwasaki, 2003; Iwasaki & Mannell, 2000) developed a leisure coping model that distinguished leisure coping beliefs from leisure coping strategies. Both coping beliefs (i.e., extent to which people believe that they can use their leisure to cope in times of stress) and coping strategies (i.e., situational leisure-based responses to stressful situations) were associated with a person's physical and psychological components. The coping strategies often included cognitive, physical, psychological, and environmental aspects of

human experience through leisure engagement (Iwasaki & Mannell, 2000). Also, it is evident that older adults' physical condition (e.g., chronic conditions: Clark et al., 1991, physical health: Rueggeberg et al., 2012, ADLs: Lee et al., 2003), psychological state (e.g., psychological health: Lavela & Ather, 2010, motivation: Dacey & Baltzell, 2008, depression: Dickinson et al., 2011, expectations: Whitehead, 2021), and environmental situation (e.g., caregiving: Longacre et al., 2017, living in long-term care: Chen, 2010) are all significant stressors among older adults. Therefore, how LEDS was factored into physical, psychological, and environmental stressors did initially make sense.

Confirmatory Factor Analysis and Validation

Distress correlation with measurement error. When CFA was first computed with the congeneric model, eustress showed an adequate goodness-of-fit statistic, but the model for distress showed a barely acceptable model fit. Correlating measurement errors between indicators can improve the reliability of the latent construct's scale, which is measured by goodness-of-fit statistics. Part of the measurement error of one indicator (item) is partially correlated with the measurement error of another indicator (item). This correlation can be due to pure randomness, but it is also possible there is something that influences both indicators (items). In order to improve the model fit, modification indices were reviewed, and pairs of measurement errors were correlated in the model. Based on a review of the items, one possible explanation for the distress model having measurement errors correlated is that the distress model has two factors instead of three, and one of those two factors is the combination of two factors from the eustress model. This means that during the process of combining two factors into one, underlying latent factor structures could exist but its statistical independence between measurement error was not secured. Therefore, it is possible that even though the current LEDS – Distress has 2

factors with physical + psychological (i.e., instead of dividing physical and psychological into two separate factors, they were combined) and environmental, it could possibly end up having three factors. More research is needed to examine further whether LEDS – Distress could consist of three factors like LEDS – Eustress and whether that three-factor model for distress shows goodness-of-fit statistics.

Discriminant validity. As seen in the findings, AVE values were not higher than the squared correlation between the dimensions for both eustress and distress, revealing that discriminant validity was not achieved. This means that although eustress and distress scales are divided into three and two factors, those factors are highly correlated with each other. There are several plausible explanations for this outcome. One possible reason is how the items and their measurement were worded. Even when measuring leisure related eustress, all items that respondents read are a list of stressors, which are worded to have negative connotations. The definition of eustress and its underlying theories state that one's experience of eustress is based on the interpretation/appraisal of a given stressor (Le Fevre et al., 2003; Spector, 1998). Providing a stressor (which naturally has a negative connotation) and asking respondents how often they perceive each stressor as a positive challenge or opportunity may not be the best way of measuring eustress.

Another reason discriminant validity was not found could be connected with the mean scores for each eustress and distress item. The mean scores for each item were examined and they were judged to be low. Specifically, each items' average for eustress and distress scales was low (average of all items' mean for eustress = 2.09, average of all items' mean for distress = 2.14) and was heavily skewed to 1 and 2. Also, even though instructions were given about how the survey items were all hypothetical leisure situations, the LEDS items may have been

perceived as more situational or activity specific, which may have impacted how respondents decided to answer those questions based on their personal experience and physical/psychological states.

Also, the factors may be naturally highly correlated, therefore a second loading factor (multi-level factoring) can also be considered. Other suggestions for future research could be to consider using an oblique rotation to analyze the factor loadings without the constraint of orthogonality found in the varimax rotation. Additionally, dropping all items that were cross loaded might solve some issues with discriminant validity as some items that were cross loaded were not removed, rather the primary researcher decided to include the items.

Lastly, it could be characteristics of the sample that were impactful. The target study sample had an average age of 67.47 years, and over 80 percent of them perceived their own health as good, very good, or excellent. Hence, it might have been that their tendency to connect leisure with stress in general was low. This was prevalent during the interviews with participants that were conducted for the phase 1 study, and although most admitted leisure related stressors exist, many of their initial responses did not indicate a connection between leisure and stress at all. Participants in the interviews and the target study perceived their health as good and the interview participants reported they actively engaged in diverse leisure activities to promote health and quality of life. Leisure was seen as an important part of their daily life and one of the essential tools for managing and coping with stress. Therefore, it is possible that this sample of older adults rarely experienced leisure-related stress and were less conscious of leisure-related stress being an issue. The results could be different if this study was replicated with older adults who have more chronic conditions or less resources (e.g., access to leisure, discretionary income) and therefore are likely to deal with more daily hassles and in turn experience more leisure-

related stress. In other words, it appears the homogeneity of the sample (in terms of health) may be a factor that limited being able to tap into experiences of leisure-related stress. A more heterogeneous sample could help resolve the issues with validity.

Theoretical and Practical Implications

The findings from the interviews contributed to better understanding the experience of eustress and distress in the context of leisure among older adults. As locus of control was one of the dominant factors that enabled and facilitated the experience of eustress, it aligns with both the control theory of occupational stress (Spector, 1998; Le Fevre et al., 2003) and the holistic stress model (Nelson & Simmons, 2003). Both models emphasize how locus of control was an important aspect that makes each individual react differently to a given stressor. Also, participants of this study indicated that having a demanding past job or life experiences made them feel more resilient, increased their level of perseverance, and made them less susceptible to negatively reacting to stressors. This confirmed Nelson and Simmons (2011)'s most recent holistic model of stress which indicated that individual's level of hardiness and sense of coherence makes each individual to better perceive a stressor as eustress than distress.

As LEDS is the first measurement scale to capture the experiences of both eustress and distress specific to leisure engagements among older adults, it can be used to construct a more holistic model of healthy aging facilitated by the experience of the self-regulation process. As older adults actively engage in self-regulation processes to maintain their engagement in leisure activities, encountering leisure oriented eustress and distress is inevitable. In fact, eustress and distress was found to play a key role on facilitating older adults' positive attitude, sense of control, satisfaction, and perseverance which helped them to better manage overall stress in life and experience healthy aging. (An, 2016). Nelson and Simmons (2011) holistic stress model

suggests that eustress facilitates hope, meaningfulness, satisfaction, and manageability to have positive outcomes such as physical and mental health, therefore LEDS can be utilized to better contextualize older adults' experience of healthy aging.

Lastly, LEDS can be used by practitioners to provide more personalized leisure/recreation programs and strategies for managing stress. First, LEDS measures how older adults would respond to physical, psychological, and environmental leisure related stressors. Having this profile, practitioners can better identify specific details of leisure related stressors that their members, clients or patients are most vulnerable to experiencing. Also, they would know the areas that their leisure program participants can better facilitate the experience of eustress while engaging in leisure activities. This may increase participants' satisfaction with the leisure program and/or experience. Also, just like knowing your own personality traits, LEDS will be able to inform you to know yourself better in the context of leisure. For example, knowing that a person perceives an environmental stressor more negatively than the psychological stressor, for instance, would help them better prepare for their own leisure engagement, so they can avoid encountering any environmental stressors.

Limitations

There are several additional limitations beyond those already mentioned in this chapter. First, since this dissertation was the development and initial validation of the LEDS, the same sample was used for the EFA and CFA. As part of validating the developed scale, it is ideal to use different samples for the EFA and CFA to secure cross validation.

First, some of the major decisions (i.e., removing all items that were considered 'constraints' and changing the measurement from 6-point Likert scale to 5-point Likert scale) that may have significantly impacted LEDS was based only on one panel of expert's suggestions

and the judgment of the researcher and advisor. Although the researcher and advisor made this decision, it would have been beneficial to share the suggestion with rest of the expert panelists and have them weigh in on the suggestion. In addition, since LEDS is considered as one scale that separately measures both eustress and distress, items were intentionally constructed to remain the same between LEDS – Eustress and LEDS – Distress. For instance, when deciding the number of items to retain, data suggested to drop six items for eustress but only three items for distress. A decision was made to drop six items for both eustress and distress to have same length of items. Considering the fact that overall construction of LEDS was emphasized to follow the data than using other existing scales or theoretical frameworks, the scale may have been constructed differently by treating the LEDS – Eustress and LEDS – Distress separately.

In hindsight, the scale that was used for concurrent validity (i.e., reworded adolescent distress-eustress scale) was not the best choice for use with the LEDS. The ADES measures the general propensity for eustress and distress with five positive items for eustress (e.g., “I felt motivated,” “I felt proud for dealing with pressure”) and five negative items for distress (e.g., “I felt overwhelmed,” “I was frustrated with myself”). This is a very different approach from the one used with the LEDS because the LEDS items were all worded negatively may provide a negative connotation. Therefore, instead of asking how an individual would respond to each given stressor in a more situational and context specific setting, ADES measures the overall feelings and whether they were deemed to be good or bad. A different scale that measures eustress and distress in a similar format with LEDS (e.g., Valencia Eustress-Distress Appraisal Scale: Rodriguez et al., 2013) should be used for future validation.

Although the goal of the research was to construct and validate LEDS for older adult population, the target sample included young-old individuals who were 50 years or above. The

phase 1 study criteria were that participants must be 60 years or older. Therefore, data that was derived from phase 1 could have been more suitable for a much older population compared to the target sample. Further validation of the scale with a sample of old-old or oldest old (at least 65 or above) rather than young-older adults would be helpful to make LEDS a better measurement. Also, participants were recruited from the Dynata, which is an online survey sampling company. Being included in Dynata's recruiting pool means that participants have engaged in many survey studies on regular basis. Also, it could be possible that their biggest motivation is to be paid small incentives for completing many surveys. Therefore, the overall quality of the data may not be representative of the overall older adult population.

Lastly, both the phase 1 and phase 2 study samples were homogenous in terms of race with approximately 90 percent of the participants being Caucasian. The findings might have varied if a more racially diverse group was sampled. Also, for the phase 1 study, a majority of the participants had at least bachelor's degree and 10 out of 25 participants had one or more graduate degrees, which indicated a very highly educated group of participants. Again, with a more diverse group of older adults in terms of their level of education, some of the findings might have been different.

Future Research

First and foremost, the LEDS would benefit from further validation studies with a different sample. The scale should be assessed with more diverse samples that include older adults with more diverse health status, education levels and who are more racially diverse. Also investigating how the LEDS scale is validated among younger group of people may also be needed to further expand the understanding of leisure related eustress-distress. During the

process of further validation, it would also be important to select more appropriate scales to assess concurrent and predictive validity.

As we often talked about leisure constraints in this study, leisure related stress, whether that is eustress or distress, could have an association with leisure constraints. In fact, leisure eustress could be experienced from the successful negotiation of leisure constraints, and/or eustress could facilitate more effective negotiation of leisure constraints. Thus, the further revision and refinement of LEDS may offer insight to understand the experience of leisure constraint negotiation. For example, older adults utilize different self-management strategies (e.g., selective optimization with compensation) to manage ongoing health conditions or any other constraints they face as part of the aging process (Janke et al., 2009). LEDS could contribute to capturing how older adults respond to different stressors in the process of negotiating constraints.

In addition, the LEDS could be better understood through the lens of personality traits. As the experience of eustress and distress is a result of interpretation and appraisal of a given stressor, personality traits could offer a deeper understanding and rationale for one's propensity to experience eustress and distress. This line of research could be developed into intervention studies to provide personality-based leisure programs or strategies where people with various different personality traits might be encouraged to have slightly different approaches to face and manages eustress and distress in the context of leisure. One could imagine helping people devise strategies to reframe the stressor as eustress rather than distress in order to negotiate or overcome the effect the stressor could have on a leisure experience. This may help people cope better with stress in the context of leisure so they can maximize the benefits of leisure and have an enjoyable experience.

Conclusion

With the ultimate goal to contribute to an understanding of how older adults perceive their daily leisure-related stressors, the aim of this dissertation was to develop and validate a measure of both eustress and distress. The first phase of this study, which were interviews with 25 older adults, offered in-depth understanding and insights on their perceptions and experience of eustress and distress in the context of leisure. Derived from those empirical data, initial items for Leisure Eustress-Distress Scale (LEDS) were developed, which then were reviewed by the author, expert panelists, and pilot study's sample for item refinement. After refinements, a target study was conducted to check the reliability and validity of the LEDS. As a result, 25 items were finalized with three factor scale for eustress (i.e., physical, psychological, and environmental) and two factor scale for distress (i.e., physical + psychological and environmental).

In the future, after further refinement and assessment, the LEDS will hopefully prove to be a useful tool and research instrument that contributes to a continuation of "leisure research that does matter" (Witt, 2000). Given that leisure is known to produce such a wide array of benefits in the many domains of life, research that continues to investigate psychological variables that facilitate or interfere with these benefits seems quite relevant to the field of recreation and leisure studies. The results of this study serve to reveal how leisure and stress are experienced differently and quite subjectively, that leisure is experienced not only as a pleasurable pursuit and source of renewal, but for some, as stress-producing or something to be struggled with.

As the main body of literature on stress in the context of leisure has focused on utilizing leisure to manage and cope with stress, development of the LEDS could possibly expand the viewpoint of understanding how stress can be helpful or harmful in the context of leisure. Even

when engaging in leisure activities, which is any free time activity that's chosen that is meaningful and enjoyable, it is evident that people are faced with some sorts of stressors. As the existence of stressors almost seems like an unavoidable part of life, it seems important to consider the possibility that a stressor can turn into eustress, not only distress. Hopefully, the LEADS can offer insights to perceive a stressor as more of an opportunity and positive challenge rather than a threat or pressure.

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Appendix A: Interview Guide

I. Introduction

Thank you for volunteering to talk with me today. My name is Jaesung An and I am a doctoral student at the University of Illinois studying recreation and leisure among older adults. In just a minute I will ask you to introduce yourself, but first I would like to go over a few things with you.

1. Purpose

During our conversation, I would like to better understand your perceptions and experience of leisure related stress. To help you out, leisure is any free time activity you choose that is meaningful and enjoyable. Although there is no time limit for this interview, it will usually last around 20 to 50 minutes.

2. Informed Consent

Informed consent for Phase 1 is prepared in a separate document.

3. Audio Recording

Because I don't want to miss anything, with your permission I would like to audio record our conversation. The audio files will be transcribed and coded to remove any identifying information. The files will be deleted after they have been transcribed and the transcripts will be deleted after three years.

II. Introductory Questions

Since COVID-19 has dramatically changed our lives and is such a unique situation, I will be asking you some questions that are based on your experience before COVID-19, and also some questions about perhaps how COVID-19 have changed your life. So, let's start with before COVID-19. Also, as I stated before, leisure is any free time activity you choose that is meaningful and enjoyable.

1. What are some of the leisure activities you enjoyed before the COVID-19?

III. Main Questions

Before COVID-19

As I just mentioned, please try to reflect to the days before COVID-19 when answering the following questions.

1. So, we talked about some of the leisure activities that you like to do such as _____. I am curious to know if there are any leisure activities that you used to

enjoy but do not or cannot participate in anymore within the past 5 years or so, and of course before the pandemic.

2. What made you discontinue those leisure activities and how did that made you feel?
3. So, you said you like to do _____ activities, have you ever encountered some challenges or constraints before or during participating in those activities? If so, can you tell me what they were?
4. What about after you engaged with that leisure activities? What are some challenges or constraints that you had?
5. Have those challenges and constraints ever prevented you from doing leisure activities? If so, how? If not, why?
6. Now, let's move on and talk about stress and leisure. I am curious to know if you ever had an experience where you felt stressed before, during, and after participating in leisure activities. What was it that made you stressed?
7. How do you usually deal with those stress(es) that you just mentioned?
8. As you may know, a stressor is something that cause you to be stressed. For example, fear of COVID-19 was a stressor for me for the last couple months. Well, I want us to talk about stressor(s) now. Please tell me anything that might have made you stressed before, during, and after participating in leisure activity.
9. People can have different reactions to stress. Sometimes a person can view stress as a positive challenge that they can work through to a positive outcome, while another person might feel overwhelmed and down which can result in feeling really bad. So, I want us to talk your experiences with this. Can you talk about when you were able to positively react to stressful situation before, during, or after doing leisure activities?
10. What are some of the things that helped you to react more positively in this stressful situation?
11. On the other hand, what are some of the things that may have caused you to react negatively to the stressful situation that you just described?

After COVID-19

Now, let's talk briefly about how COVID-19 might have changed our leisure related experience.

1. What are some of the leisure activities that you enjoy doing nowadays?
2. Has COVID-19 caused any changes to how you participate in leisure activities? If so, how?
3. Previously, you talked about _____ as to be your leisure related stressor(s), the things that caused you to feel stress before, during, and after participating in leisure activities. So, now what are some of the challenges or constraints that you have when participating in leisure activities?

4. Are those challenges/constraints you just talked about stopping you from participating in leisure activities? If so, what are you doing instead? If not, what made you still continue?
5. (If COVID-19 is not mentioned as one of the stressors, ask this question) Do you consider COVID-19 to be one of the challenge or constraints that gets in your way from participating in leisure activities? If so, how is that effecting your leisure activities? If not, why?
6. (If answered yes on question #5) As COVID-19 being one of the challenges you face to participate in leisure activities, have you ever consider it as something that you can overcome and eventually have positive outcome? If so, what made you to think that way and what would that positive outcome be? If not, what made you feel like you can't do that.
7. Has your definition of the term healthy aging changed after COVID-19?
8. Has your perception or how you value leisure has changed after COVID-19?
9. What role do you think leisure is playing during this time of pandemic?

IV. Thank you and Wrap up

Well that is it for me; do you have anything to add before we wrap up? Any questions?

I really enjoyed our conversation and today's discussion will help me to better understand how older adults experience leisure related stress. Thank you so much.

(Turn off recorder)

Appendix B: Item Content Validity Index (I-CVI)

The following items have been generated from a thorough review of the literature and qualitative analysis derived from interviews with older adults. Since the experience of eustress and distress is a result of interpreting a stressor, leisure based eustress-distress scale (LEDS) will consist of items that comprise different aspects of leisure related stressors.

Rating Tasks:

Each item will be rated using the 4-point ordinal scale:

<p>1 = item is not relevant, 2 = item needs some revision, 3 = relevant but needs minor revision, and 4 = very relevant.</p>
--

The I-CVI will be computed as the number of experts judging the items as relevant (rating 3 or 4) divided by the total number of content experts.

Potential Items:	Rating Scale			
1. Put item #1 here.	1	2	3	4
2. Put item #2 here.	1	2	3	4
...				
# last item here.	1	2	3	4

Please list your comments about any problematic items concerning relevance, readability, or clear meaning.

Item #:	Comments/Suggestions:

Appendix C: Revised Adolescent Distress-Eustress Scale (ADES: Branson et al., 2019)

These questions are about **how you respond to pressure before, during, and after engaging in leisure activities**. Everybody responds to pressure differently at different times. Pressure can be good for you, bad for you, or a bit of both. For each item below, please choose the answer that best describes how you responded to pressure **in the last 7 days**.

	0	1	2	3	4
	Not like me	Somewhat like me			Very much like me
1. I felt motivated	0	1	2	3	4
2. My mind was racing out of control	0	1	2	3	4
3. I felt the outcome was worth the effort	0	1	2	3	4
4. I was satisfied with how I dealt with the pressure ...	0	1	2	3	4
5. I felt panicked	0	1	2	3	4
6. I felt overwhelmed	0	1	2	3	4
7. I felt anxious	0	1	2	3	4
8. I felt determined	0	1	2	3	4
9. I felt proud for dealing with the pressure	0	1	2	3	4
10. I was frustrated with myself	0	1	2	3	4

Appendix D: Leisure Satisfaction Scale (LSS: Beard & Ragheb, 1980)

0 = Almost Never 1 = Seldom 2 = Sometimes 3 = Often 4 = Almost Always

Need areas	Statements (items)
Psychological	My leisure activities are very interesting to me 0 1 2 3 4
	My leisure activities give me self-confidence 0 1 2 3 4
	My leisure activities give a sense of accomplishment 0 1 2 3 4
	I use many different skills and abilities in my leisure activities 0 1 2 3 4
Educational	My leisure activities increase my knowledge about things around me 0 1 2 3 4
	My leisure activities provide opportunities to try new things 0 1 2 3 4
	My leisure activities help me to learn about myself 0 1 2 3 4
	My leisure activities help me to learn about other people 0 1 2 3 4
Social	I have social interaction with others through leisure activities 0 1 2 3 4
	My leisure activities have helped me to develop close relationships with others 0 1 2 3 4
	The people I meet in my leisure activities are friendly 0 1 2 3 4
	I associate with people in my free time who enjoy doing leisure activities a great deal 0 1 2 3 4
Relaxational	My leisure activities help me to relax 0 1 2 3 4
	My leisure activities help relieve stress 0 1 2 3 4
	My leisure activities contribute to my emotional well-being 0 1 2 3 4
	I engage in leisure activities simply because I like doing them 0 1 2 3 4
Physiological	My leisure activities are physically challenging 0 1 2 3 4

	I do leisure activities which develop my physical fitness 0 1 2 3 4
	I do leisure activities which restore me physically 0 1 2 3 4
	My leisure activities help me stay healthy 0 1 2 3 4
Aesthetic	The areas or places where I engage in my leisure activities are fresh and clean 0 1 2 3 4
	The areas or places where I engage in my leisure activities are interesting 0 1 2 3 4
	The areas or places where I engage in my leisure activities are beautiful 0 1 2 3 4
	The areas or places where I engage in my leisure activities are well designed 0 1 2 3 4