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Development and Validation of the Social Ecological Resilience Scale (SERS) from a Systems Perspective for Hong Kong Families

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ABSTRACT

This study examined the construct of resilience from a systems perspective and developed a new Social Ecological Resilience Scale measuring resilience in Hong Kong families. A total of 506 service users were recruited using convenience sampling. Exploratory Factor Analysis was used to uncover the factor structures, while Confirmatory Factor Analysis was conducted to test the scale's internal reliability and validity. A 44-item scale with a six-factor structure comprising emotional flexibility, coping, self-kindness, common humanity, family support and social support was revealed. The implications for conceptualizing resilience from a broader socio-cultural perspective and developing interventions are discussed.

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Introduction

Resilience is defined as the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress—such as family and relationship problems, serious health problems, or workplace and financial stressors’ (American Psychological Association, 2012). On the other hand, social ecological resilience (SER) emphasizes the influence of the social and environmental context on individual processes and outcomes. It refers to an individual’s ability to “navigate their way to the psychological, social, cultural, and physical resources that sustain their wellbeing, and their capacity individually and collectively to negotiate for these resources to be provided and experienced in culturally meaningful

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ways” (Ungar, 2011, p. 225). Indeed, social ecological resilience is considered a critical protective factor that helps an individual manage negative psychological states during adversities.

The dominant literature conceptualizes resilience within an intrapersonal framework, focusing on understanding individual psychological characteristics, such as intelligence, impulse control, and positive self-concept, that influence an individual’s experience in bouncing back from adversity (Meisels & Shonkoff, 2000). However, some scholars assert that such heavy emphasis on intrapersonal factors ignores the influence of ecological and systemic factors impacting a person’s resilience (e.g., Waller, 2001) and argue that resilience should best be conceptualized as a product of an interplay among various factors including social, psychological, economic, biological, and historic factors played out at individual, interpersonal, family and ecosystem levels (Criss et al., 2015). For example, in a systematic review of resilience studies following the PRISMA approach and procedures, Vaughn and DeJonckheere (2021) conducted a narrative review of 37 studies across the fields of education, psychology, and social work to examine the social ecological factors influencing wellbeing among youth. They maintained that most existing studies focused on the individual level of resilience, and insufficient attention was paid to the role of social determinants/influences of health and wellbeing. Specifically, the SER perspective should prioritize the interactions among the many different personal, social, cultural, and environmental factors related to youth resilience so that interventions targeting “at-risk” youth would examine the influence of context-specific and culture-specific factors in building youth’s resilience. Unfortunately, there is still very little research that has adopted an SER perspective to identify the specific social ecological factors influencing the resilience of a specific target population.

Towards an understanding of the social ecological model of resilience

Drawing on the seminal work of Bronfenbrenner and Ceci (1994), a resilience perspective comprises six subsystems nested within each other: the biopsychological system, microsystem, mesosystem, exosystem, macrosystem, and chronosystem.

Individual level

According to the American Psychological Association (2012), how well an individual can develop emotional self-regulation, flexibility, and positive coping strategies impacts their emotions, family dynamics, and family functioning. Extensive literature on protective factors of individual resilience identifies self-efficacy, positive outlook, and emotional regulation as the

most salient protective factors (Martin et al., 2015). People with high self-efficacy are better able to achieve their goals and make meaning of adversity in various circumstances (Benzies & Mychasiuk, 2009). They tend to be confident in coping with difficulties and negative circumstances. A positive outlook is viewed as a positive belief system signifying an individual's ability to remain optimistic despite confronting adverse situations (Bhana & Bachoo, 2011). People who can find positive meaning in negative events tend to produce positive emotions, in turn facilitating the buffering of stress (Folkman & Moskowitz, 2000). Emotion regulation refers to the specific strategies employed along the timeline of emotional response arousal, influencing the expression and experience of different types of emotions (Gross, 1998). In emotion regulation, positive reappraisal can help an individual generate positive emotions, which are useful to counteract negative emotional experiences and build resilient resources and coping strategies (Fredrickson, 2001). With effective emotional regulation, optimism, and a high sense of self-efficacy in coping, individuals can become more resilient to withstand family stress and crises, consequently leading to healthier individual and family functioning.

Other positive personality traits of an individual can be grouped under individual-level factors that constitute the concept of resilience. Previous studies have found a positive relationship between self-compassion and resilience. Self-compassion can be regarded as an adaptive process that enhances psychological resilience and mental wellbeing (Neff, 2003). Self-compassionate people tend to have a balanced viewpoint with less harsh self-criticism. In addition, self-acceptance is closely associated with resilience. Self-acceptance refers to how a person judges and accepts themselves, whether good or bad (Chen et al., 2011). When individuals become more aware of themselves and try to accept both positive and negative personal attributes, they have a stronger sense of self-efficacy to deal with life's adversities. Interestingly, there may be some cultural differences in self-acceptance and self-criticism (i.e., components of self-compassion). Heine et al. (2001) noted that self-criticism is not exactly the same as self-judgment. Asian self-criticism is typically defined as attending to negative self-relevant information, which does not automatically imply harsh self-condemnation but may instead represent self-improvement motives. How and whether self-acceptance would be included as part of the resilience construct in Hong Kong families would be of interest to researchers and practitioners.

On the whole, these personality traits or internal attributes have been found to have strong associations with resilience and can be seen as possible components of the concept of social ecological resilience. In sum, at the individual level, this study included several factors: emotional flexibility

and coping ability (i.e., emotional regulation), self-compassion and self-acceptance that could potentially contribute to understanding the construct of resilience.

Family and microsystem levels

Like other individual-level resilience-related factors, family support plays a crucial developmental role in the life course of the family members. Mutual support among family members not only enables an individual to gain confidence in coping but can also strengthen healthy functioning within a family. Supportive family members can provide nurturance and a sense of comfort that are a secure anchor supporting family members in adversities (Walsh, 2003). Bae and Kung (2000) found that a strong supportive family with available resources can buffer individuals from negative emotional experiences of life adversities. Previous studies have identified a series of protective factors and resources contributing to resilience in families. Family communication, connectedness, flexibility, or shared recreation can be regarded as supportive resources for family members (Martin et al., 2015). Therefore, tangible and intangible support from family members plays a crucial role in developing emotional resilience when considering factors contributing to resilience. Family support is said to be of greater importance for Chinese families. In a collectivist society which places a high value on the “inner-outer circle of support”, “family pride and shame”, and “family harmony”, individuals in a Chinese family normally rely on other members within the family unit for various types of support and only in the most dire or urgent circumstances would a family seek help from outsiders, including professionals (Bond, 2010). As such, strong family support may be essential for building social ecological resilience among Chinese people.

At the microsystem level, the quality of family relationships plays an important role in enhancing family members’ resilience. In the face of adversity, the family unit can provide resources such as guidance, reassurance, attachment, and integration through sharing common beliefs and providing relational and structural support (Walsh, 2016). Family dysfunction can significantly adversely affect each family member’s emotional and personal development (Kim & Miklowitz, 2004). Parent-child conflicts are perceived as risk factors for family functioning. Some research has revealed a negative correlation between parent-child relationships and family functioning in Chinese families with an adolescent with a depressive disorder (Li et al., 2018). Couple relationships also have significant relevance for family functioning in the sense that high-quality marital interaction facilitates family adjustment (Yates et al., 1995). Essentially, the parental couple is the central pillar in families with children, and support and affirmation

between parents are highly relevant to the wellbeing of the family unit (Sprenkle & Olson, 1978). Hence, extant research highlights the importance of family relationships in enhancing an individual family member's emotional resilience.

Interpersonal and exosystem levels

Luthar and Cicchetti (2000) have pointed out that a good understanding of the dynamic process of resilience should incorporate a broader and inter-relational framework. One such important factor is social support. Social support is defined as “the support accessible to an individual through social ties to other individuals, groups, and the community” (Lin et al., 1979, p. 109). Informal social support from family members and friends can create a “central helping system” for a person to access support to deal with life difficulties (Canavan & Dolan, 2000). Indeed, social support operates at multiple levels and functions in a social system that helps support and encourage healthier coping behaviors (Sippel et al., 2015). Previous studies have ascertained that social support plays a significant role in an individual's coping success (Eckenrode & Hamilton 2000), building resilience (Rutter, 1999) and moderating stress resulting from genetic and environmental vulnerabilities (Ozbay et al. 2007).

The utilization of community resources, as indicated by accessing resources and support in the neighborhood network, friends, and public service agencies in the community, is considered an important exosystem factor contributing to individual resilience and psychological wellbeing (Ungar et al., 2013). Walsh (2003) argues that community efforts involving local agencies and residents are essential for meeting the challenges of a major crisis. The availability of a quality community support system can enhance positive outcomes in families, such as hope and perseverance, especially in impoverished families (Aronowitz & Morrison-Beedy, 2004). Despite families being a primary unit on which individuals can rely, Chinese culture values neighborhood support in dealing with people's daily lives, as reflected in the Chinese saying, “A good neighbor outmatches a distant relative.” (Yuan & Ngai, 2012). Mutual support and collective resources from the community are important agents in promoting family resilience in Chinese communities. Hence, there is value in exploring the utilization of community resources in the concept of resilience among Hong Kong families.

To summarize, the social ecological model of resilience facilitates the identification of different factors at different levels in an individual's social ecological system that might be highly relevant to the concept of resilience. As mentioned above, very few studies have systematically adopted a social ecological perspective to examine the concept of resilience, and no

validated scale measuring social ecological resilience exists. The development of a specific social ecological resilience scale for understanding the resilience of family members would provide a useful tool for professionals to quickly assess the personal and environmental resources of an individual family member and help them devise strategies to strengthen certain social ecological factors that can enhance the person's social and mental functioning.

Relevant measures relating to social ecological resilience in a familial context

Family life plays a significant role at an individual's interpersonal level, and it is believed that the ability to withstand and bounce back from adversities in family members is highly associated with resilience. However, to our knowledge, no validated measurement captures a social ecological perspective in understanding the resilience of a family member. Using the ecological perspective of resilience proposed by Bronfenbrenner and Ceci (1994), our team has explored existing scales about different systems' factors influencing the resilience of a family member. The strategy of exploring existing scales to form the item pool is not uncommonly practiced in this line of scale construction. For example, in the study of youth resilience using a social ecological perspective, Van Breda (2017) and Amini-Tehrani et al. (2020) drew on existing relevant scales to form the initial item pools in developing their social ecological resilience scales for university students and youth, respectively. The choice of a particular scale was based on its relevance to the theoretical constructs and definition of resilience that members of the respective research teams developed. We followed the same format and drew on existing scales to form our initial item pool that constituted the construct of social ecological resilience among family members in Hong Kong.

The first scale reviewed was the Adolescents' Emotional Resilience Questionnaire (Zhang & Lu, 2010). According to Zhang and Lu (2010), existing measures of resilience seldom consider emotion-related factors to understand resilience. Given the significant role played by "emotions" in influencing resilience, Zhang and Lu developed an emotional resilience scale – using the concept of emotional flexibility (e.g., the competence of generating positive emotions and recovering from negative experiences) – as the critical component of emotional resilience. However, their scale focuses on the individual level only and does not include other levels that may contribute to measuring emotional resilience. Another scale commonly used to measure resilience is the Connor-Davidson Resilience Scale (Connor & Davidson, 2003), developed to measure five dimensions of an

individual's ability to cope with stress: (1) personal competence, (2) trust in instincts, tolerance of negative affect, and strengthening effects of stress, (3) positive acceptance of change and secure relationships, (4) control, and (5) spiritual influences. This scale tends to measure resilience from the perspective of personality traits rather than emotional strengths. Similarly, the Resilience Scale developed by Wagnild and Young (1993) measures a person's resilience from an intrapersonal domain, including positive personality characteristics and individual resilience. Lastly, Friborg et al. (2003) constructed the Resilience Scale for Adults, which assesses resilience from the perspectives of both intrapersonal and interpersonal factors (e.g., personal structure, personal and social competence, social resources, and family coherence). Apart from the latter scale, all these scales focus mainly on the intrapersonal level of resilience.

As for measures of family resilience, Sixbey (2005) constructed the Family Resilience Assessment Scale to explore the essential components constituting the concept of family resilience: family communication and problem-solving, utilizing social and economic resources, maintaining a positive outlook, family connectedness, family spirituality, ability to make meaning of adversity. These six domains capture the internal and external family resources for strengthening the family's ability to cope and grow despite adversities. However, each individual scale fails to measure the various levels of the ecological factors influencing family members' resilience comprehensively.

A review of these resilience and family resilience scales shows that resilience is mostly conceptualized as positive personal attributes in the intrapersonal domain. In addition, when measuring resilience, external support from family and social support networks are indispensable factors that should also be considered.

Knowledge gap

Several knowledge gaps remain to be addressed. First, most existing scales have been developed to measure the individual level of resilience but fail to address its social ecological dimensions. Second, no consensus exists regarding theorizing and conceptualizing a social ecological model of resilience. This may be partly because social ecological factors leading to the building of resilience differ from one target group to another. Therefore, there is a need to develop a target-specific resilience scale. Lastly, no culturally relevant scale measures social ecological resilience in a specific target group in any Chinese population groups. Such an attempt is essential as it recognizes the importance of culture in influencing the development of resilience in a specific cultural group (Ungar, 2011).

Study objectives

This study adopted a social ecological perspective of resilience, and drew on various items from existing scales measuring different systems' factors to conduct a validation study to develop a social ecological resilience scale in the Chinese family context. The main objective was to develop and validate the SERS to measure resilience from a systems perspective for individuals in a Hong Kong family context.

Methodology

Respondents and procedures

Respondents were recruited online through an open platform and 17 Integrated Family Service Centres in Hong Kong using convenience sampling. Integrated Family Service Centres are operated by the government's Social Welfare Department and subvented non-governmental organizations, that provide various preventive, supportive, and remedial family services for individuals and families in Hong Kong. Four hundred and forty respondents were recruited from the Integrated Family Service Centres, and 66 online. Inclusion criteria for respondents were: (1) Chinese people aged 18 years or above and (2) able to read Chinese. All respondents were recruited between April and May 2021. Respondents were informed about the research procedure, the voluntary nature of their participation, risks, and confidentiality. The Human Research Ethics Committee at the authors' educational institution provided ethical approval for the study.

Measures

Item statements were extracted from several relevant scales, as listed below, to generate an initial item pool. These scales had been validated and widely used; therefore, the direct adoption of those item statements could ease the traditional procedures of generating item statements through pilot studies or focus group interviews. Therefore, these validated item statements were ready for inclusion in the Social Ecological Resilience Scale.

Emotional flexibility

Emotional flexibility was measured by the Adolescents' Emotional Resilience Questionnaire (Zhang & Lu, 2010), which assesses the ability to produce positive emotion and recover from negative emotional experiences. This 11-item scale comprises two subscales: generation of positive emotion (e.g., "Regardless of the kind of difficulties I encounter, I can still maintain a good mood") and recovery from negative emotion (e.g., "I can readjust

my negative moods in a short period of time”). Scoring uses a 6-point Likert scale, ranging from 1 = *strongly disagree* to 6 = *strongly agree*. A higher mean score indicates higher emotional flexibility.

Coping ability during stressful times

Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale assesses self-efficacy in terms of an individual's coping ability to deal with stressful and demanding circumstances. The Chinese version of this scale was adopted in this study to measure respondents' coping ability (Chiu & Tsang, 2004). The 10-item scale measures an individual's confidence to cope with new and demanding situations. It uses a 4-point Likert scale, ranging from 1 = *not at all true* to 4 = *exactly true*. A higher total score indicates more capability to cope with adversities.

Self-compassion

The Self-Compassion Scale (Neff, 2003) is a 26-item questionnaire comprising six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness and overidentification. The Chinese version of the scale was adopted (Chen et al., 2011). The self-kindness, self-judgment and common humanity subscales were used to measure self-compassion in terms of the degree of kindness and self-criticism and recognition of universal human experiences. The scale uses a 5-point Likert scale ranging from 1 = *almost never* to 5 = *almost always*. A higher mean score indicates higher self-compassion.

Self-acceptance

The Psychological Wellbeing Scale (Ryff, 1989) is a 42-item questionnaire measuring an individual's wellbeing and happiness. The Chinese version of the scale was validated by Cheng & Chan (2005). In this study, the self-acceptance subscale was used to measure the individual's acceptance of various aspects (i.e., both positive and negative qualities) of themselves. This scale uses a 7-point Likert scale, ranging from 1 = *strongly disagree* to 7 = *strongly agree*. A higher total score indicates more acceptance of positive and negative dimensions.

Family support

The Family Resilience Assessment Scale (Sixbey, 2005) measures an individual's subjective perception of facing adversities in their family. In this study, the family communication and problem-solving, maintaining a positive outlook, ability to make meaning of adversity, and family connectedness subscales were used to measure family support and family members'

capacity to rebound from adversity. It uses a 4-point Likert scale, ranging from 1 = *totally disagree* to 4 = *totally agree*. A higher total score indicates more family support.

Social support and use of community resources

Social support was measured by the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988), a 12-item measure examining the perceived amount of social support from three sources: family, friends, and significant others. It uses a 5-point Likert scale, ranging from 0 = *strongly disagree* to 5 = *strongly agree*. In this study, items from the friends and significant others domains were selected. A higher mean score indicates higher perceived support gained. The utilizing social and economic resources subscale from the Family Resilience Assessment Scale (Sixbey, 2005) was used to measure respondents' ability to gain support by utilizing community resources. It uses a 4-point Likert scale ranging from 1 = *totally disagree* to 4 = *totally agree*. A higher total score indicates more perceived support gained from community resources.

The following instruments were used to evaluate the construct, concurrent, convergent, and discriminant validity of the Emotional Resilience Scale.

Family functioning

Family wellbeing was assessed by the general functioning subscale of the McMaster Family Assessment (Boterhoven de Haan et al., 2015). This 6-item scale was designed to assess a family's overall functioning and health. It uses a 4-point Likert scale, ranging from 1 = *strongly agree* to 4 = *strongly disagree*. A mean score exceeding 2 is considered unhealthy family functioning. In this study, the scale attained a high level of internal consistency (Cronbach's α 0.916).

Brief resilience scale

The level of individual resilience was measured by the Brief Resilience Scale (Smith et al., 2008), developed to assess the perceived ability of an individual to bounce back and recover from adversities. This 6-item scale uses a 5-point Likert scale, ranging from 1 = *low resilience* to 5 = *high resilience*. A higher total score indicates higher resilience. In this study, the scale showed good internal consistency (Cronbach's α of 0.795).

Depression, anxiety and stress

Respondents' negative emotional states were measured by the Depression Anxiety Stress Scale-21 (DASS-21) (Lovibond & Lovibond, 1995). It is a self-report scale designed to measure respondents' affective states of

depression, anxiety, and stress during the previous week. It comprises 21 items, with seven items in each subscale. It uses a 4-point Likert scale rated from 0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*. A higher score indicates more severity in the corresponding dimension. In this study, the scale attained high internal consistency (Cronbach's α 0.922 for depression, 0.904 for anxiety, and 0.906 for stress).

Data analysis

The total dataset ($N = 506$) was first randomly divided into two equal sub-datasets. One sub-dataset ($n = 253$) was used for the EFA, and the other half ($n = 253$) for the CFA. EFA was conducted with SPSS 23.0 to identify the latent factor structure of the ERS. Subsequently, CFA was undertaken using Mplus (8.0) to validate the factorial constructs. After retaining the appropriate items through EFA and CFA, a one-way analysis of covariance (ANCOVA) was conducted to identify any statistically significant differences in family functioning and psychological wellbeing between high-risk and low-risk groups.

Results

Exploratory factor analysis

Descriptive statistics

Data from 253 questionnaires were used for EFA. Table 1 presents respondents' demographic information. 77.1% were female and 22.9% were male. Most were in middle adulthood ($M = 45.13$, $SD = 12.30$). Around half were married (48.2%), and most had children (77.9%). Over one-third were family caregivers (36.8%), and over 70% had a family monthly income of less than HK\$20,000 (72.4%). Chi-square tests and t -tests reflected no demographic differences between the EFA and CFA samples (Table 1).

Factor structure

The total sample ($N = 506$) was randomly divided equally to conduct EFA and CFA, respectively. The original item pool contained 90 items from the various existing scales, with 11 items on emotional flexibility, 10 items on coping ability, 21 items on self-compassion, self-kindness, and self-acceptance, 37 items on family support and 11 items on social support and community resources. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.916, and Bartlett's test of sphericity was statistically significant ($\chi^2 = 10,039.64$, $df = 1431$, $p < .000$). Principal axis factor analysis with promax oblique rotation was carried out. Items were removed based on their

Table 1. Respondents' demographic information (*N* = 506).

Variables	Mean (<i>SD</i>)		t-test	p value
	EFA sample (<i>n</i> = 253)	CFA sample (<i>n</i> = 253) <i>n</i> (%)		
Age	45.13 (12.30)	43.96 (12.74)	1.058 chi-square test	.291 .185
Gender				
Male	58 (22.9)	71 (28.1)		
Female	195 (77.1)	182 (71.9)		
Marital status			2.301	.681
Single	49 (19.4)	51 (20.2)		
Married	122 (48.2)	111 (43.9)		
Separated/Divorced	66 (26.1)	76 (30.0)		
Widowed	13 (5.1)	14 (5.5)		
Others	3 (1.2)	1 (0.4)		
Have child(ren)			0	–
Yes	197 (77.9)	197 (77.9)		
No	56 (22.1)	56 (22.1)		
Education level			3.200	.669
Primary education or below	25 (9.9)	19 (7.5)		
Primary education	21 (8.3)	30 (11.9)		
Secondary education	151 (59.7)	144 (56.9)		
Associate degree/diploma	19 (7.5)	23 (9.1)		
Bachelor degree	26 (10.3)	24 (9.5)		
Master degree or above	11 (4.3)	13 (5.1)		
Main employment			4.930	.553
Full-time	51 (20.2)	60 (23.7)		
Part-time	36 (14.2)	64 (25.6)		
Family caregiver	93 (36.8)	96 (37.9)		
Student	5 (2.0)	11 (4.3)		
Waiting for employment	11 (4.3)	9 (3.6)		
Unemployed	32 (12.6)	29 (11.5)		
Retired	25 (9.9)	20 (7.9)		
Residential district in Hong Kong			1.656	.647
Hong Kong Island	38 (15.0)	41 (16.2)		
Kowloon	125 (49.4)	129 (51.0)		
New Territories	89 (35.2)	80 (31.6)		
Others	1 (0.4)	3 (1.2)		

Living alone					
Yes	39 (15.4)	37 (14.6)	76 (15.0)	0.062	.803
No	214 (84.6)	216 (85.4)	430 (85.0)		
Family monthly income				7.847	.249
No income	60 (23.7)	52 (20.6)	112 (22.1)		
HK\$10,000 or below	50 (19.8)	72 (28.5)	122 (24.1)		
HK\$10,001–HK\$20,000	73 (28.9)	71 (28.1)	144 (28.5)		
HK\$20,001–HK\$30,000	30 (11.9)	24 (9.5)	54 (10.7)		
HK\$30,001–HK\$40,000	7 (2.8)	10 (4.0)	17 (3.4)		
HK\$40,001–HK\$50,000	16 (6.3)	9 (3.6)	25 (4.9)		
HK\$50,001 or above	17 (6.7)	15 (5.9)	32 (6.3)	0.543	.969
Physical health					
Excellent	12 (4.7)	15 (5.9)	27 (5.3)		
Good	85 (33.6)	84 (33.2)	169 (33.4)		
Fair	110 (43.5)	112 (44.3)	222 (43.9)		
Poor	37 (14.6)	34 (13.4)	71 (14.0)		
Very poor	9 (3.6)	8 (3.2)	17 (3.4)		

factorability, and those with factor loadings over 0.6 were retained. This procedure generated an 8-factor structure for 54 items, accounting for 65.41% of the total variance. The eigenvalues ranged between 1.10 and 16.30 (Table 2). Factor 1 comprised 20 items associated with resilient resources and support gained from family members and was designated *Family Support* (30.18%). Factor 2 contained eight items associated with gaining resources from social networks and was designated *Social Support* (11.31%). Factor 3 consisted of nine items associated with an individual's response in times of adversity and was designated *Coping Ability* (6.61%). Factor 4 contained five items associated with recovery from negative emotions and was designated *Emotional Flexibility* (6.22%). Factor 5 consisted of four items associated with understanding that everyone would face adversity and was designated *Common Humanity* (3.86%). Factor 6 contained three items associated with understanding and tolerance of oneself and was designated *Self-kindness* (2.85%). Factor 7 contained three items associated with self-criticism and was designated *Self-judgment* (2.35%). Factor 8 contained two items associated with accepting one's positive and negative qualities and was designated *Self-acceptance* (2.04%).

Internal consistency reliability

The internal consistency of the SERS was satisfactory in general. For the total SERS score, Cronbach's α and Guttman's split-half reliability were 0.945 and 0.802, respectively. The corrected item-total correlations of each item were above 0.501, except Factor 8 (0.144). Cronbach's α was 0.956 for Factor 1, 0.966 for Factor 2, 0.920 for Factor 3, 0.847 for Factor 4, 0.819 for Factor 5, 0.928 for Factor 6, 0.669 for Factor 7, and 0.251 for Factor 8. Factors 7 and 8 were removed for the subsequent CFA because their internal consistency reliability was unsatisfactory.

Confirmatory factor analysis

Descriptive statistics

After obtaining the proposed factor structure through the EFA, the second half of the data ($n = 253$) was used in the CFA. Table 1 presents respondents' demographic information. Most (71.9%) were female and 28.1% were male. Most respondents were in middle adulthood ($M = 43.96$, $SD = 12.74$), and most had children (77.9%). Over one-third were family caregivers (37.9%), and 77.2% of families had a monthly income under \$20,000.

Construct validity

In CFA, the second-order 6-factor was used to analyze the construct validity. The goodness of model fit was assessed by a range of fit indices

Table 2. Results of exploratory factor analysis (N = 253).

Factor	Item statement	Factor loading							
		F1	F2	F3	F4	F5	F6	F7	F8
1	55. We consult with each other about decisions.	0.793							
	53. We can talk about the way we communicate in our family.	0.785							
	49. We can be honest and direct with each other in our family.	0.778							
	58. We discuss things until we reach a resolution.	0.775							
	51. We can compromise when problems come up.	0.774							
	57. We discuss problems and feel good about the solutions.	0.772							
	54. We can work through difficulties as a family.	0.757							
	47. We are understood by other family members.	0.754							
	56. We define problems positively to solve them.	0.739							
	44. We are able to work through pain and come to an understanding.	0.731							
	62. We share responsibility in the family.	0.724							
	52. We can deal with family differences in accepting a loss.	0.708							
	63. We try new ways of working with problems.	0.703							
	59. We feel free to express our opinions.	0.692							
	61. We learn from each other's mistakes.	0.691							
	65. We work to make sure family members are not emotionally or physically hurt.	0.658							
	48. We can ask for clarification if we do not understand each other.	0.656							
	50. We can blow off steam at home without upsetting someone.	0.653							
	60. We feel good giving time and energy to our family.	0.626							
	45. We are adaptable to demands placed on us as a family.	0.625							
2	82. I have a special person who is a real source of comfort to me.		0.902						
	86. There is a special person in my life who cares about my feelings.		0.874						
	83. My friends really try to help me.		0.868						
	81. There is a special person with whom I can share joys and sorrows.		0.865						
	85. I have friends with whom I can share my joys and sorrows.		0.858						
	80. There is a special person who is around when I am in need.		0.847						
	84. I can count on my friends when things go wrong.		0.842						
	5. Thanks to my resourcefulness, I know how to handle unforeseen situations.		0.810				0.846		
	9. If I am in trouble, I can usually think of a solution.						0.764		
	6. I can solve most problems if I invest the necessary effort.						0.760		
3	8. When I am confronted with a problem, I can usually find several solutions.						0.745		
	4. I am confident that I could deal efficiently with unexpected events.						0.738		
	7. I can remain calm when facing difficulties because I can rely on my coping abilities.						0.737		

(continued)

Table 2. Continued.

Factor	Item statement	Factor loading							
		F1	F2	F3	F4	F5	F6	F7	F8
4	1. I can always manage to solve difficult problems if I try hard enough.			0.696					
	10. I can usually handle whatever comes my way.			0.688					
	3. It is easy for me to stick to my aims and accomplish my goals.			0.649					
	10. The misunderstanding of others will make me feel sad.				0.790				
5	6. The criticism and accusation of others will make me sad for a long time.				0.763				
	7. Things that are unhappy will trouble me for a long time.				0.748				
	11. After quarreling with others, it is difficult for me to calm down.				0.747				
	9. Unpleasant things during the day often make it difficult for me to sleep at night.				0.665				
6	33. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am.					0.837			
	34. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.					0.823			
	35. I try to see my failings as part of the human condition.					0.704			
	32. When things are going badly for me, I see the difficulties as part of life that everyone goes through.					0.625			
7	24. I'm kind to myself when I'm experiencing suffering.						0.753		
	23. When I'm going through a very hard time, I give myself the caring and tenderness I need.						0.746		
	22. I try to be loving towards myself when I'm feeling emotional pain.						0.724		
	27. When I see aspects of myself that I don't like, I get down on myself.							0.716	
8	28. When times are really difficult, I tend to be tough on myself.							0.710	
	29. I can be a bit cold-hearted towards myself when I'm experiencing suffering.							0.685	
	41. My attitude about myself is probably not as positive as most people feel about themselves.								0.695
	38. I feel like many of the people I know have gotten more out of life than I have.								0.600
Eigenvalue		16.30	6.11	3.57	3.36	2.08	1.54	1.27	1.10
Explained variance (%)		30.18	11.31	6.61	6.22	3.86	2.85	2.35	2.04
Cumulative variance (%)		30.18	41.50	48.10	54.32	58.17	61.03	63.37	65.41

validity of a construct was also assessed by computing the Average Variance Extracted (AVE). If all values of AVE are greater than 0.5, convergent validity is attained (Hair et al., 2009). In this study, the AVEs of each factor fell within the range of 0.556–0.808. These results provided initial evidence supporting the good concurrent and convergent validity of the ERS.

Reliability analysis

Cronbach's α revealed that the reliability level of the overall scale (44 items) reached 0.949. Cronbach's α was also satisfactory for the subscales: Family Support ($\alpha = 0.969$), Social Support ($\alpha = 0.964$), Coping Ability ($\alpha = 0.927$), Emotional Flexibility ($\alpha = 0.83$), Common Humanity ($\alpha = 0.826$), and Self-kindness ($\alpha = 0.923$). That all the reliability values were greater than 0.70 suggests that both the overall scale and subscales achieved good internal consistency.

Discussion

Psychometric properties of the social ecological resilience scale for Hong Kong families

This study aimed to develop the first empirically grounded instrument to measure the social ecological factors influencing Hong Kong family members' resilience by adopting a social ecological model of resilience. A 90-item pool was first generated through a thorough review of the major empirical studies on resilience and their relevant scales. The number of items was reduced to 44 through EFA and CFA to form the final version of the Social Ecological Resilience Scale (SERS). Cronbach's α and Guttman's split-half reliabilities for the SERS fell into the acceptable range. The total SERS score was highly correlated with the six subscale-scores, indicating that the six factors measured a closely related construct. In addition, the cross-validation of the factor structure with the other half of the sample further confirmed the scale's factor structure. CFA added another layer of clarity to the construct validity of the SERS factor structure. The goodness of the model fit with its satisfactory fitness indices indicated that construct validity was achieved. The correlations of SERS and criterion measurements in the expected directions indicated the scale's good concurrent validity. To conclude, the EFA and CFA results provided strong evidence that SERS shows good psychometric properties with satisfactory reliability and validity.

Dimensions of social ecological resilience in a familial context

In this study, SERS comprised six dimensions from intrapersonal, interpersonal, and family domains. This is consistent with the social ecological

model of resilience with factors nested within the multi-layered individual-, micro-, and exo-systems. The intrapersonal strength dimension in resilience involves adaptive coping strategies, flexibility to recover from negative emotions, being kind to oneself and understanding undesirable feelings as part of the shared human experience. As for the interpersonal domain, resources from family and social networks play a significant role in building family members' resilience. This confirms our initial hypothesis that SERS is a multidimensional concept, involving both internal strength and external supportive resources (Martin et al., 2015). Our study differs from previous studies in amassing different factors from various studies into a unifying model and demonstrating that the multi-dimensional components of the SERS can be subsumed under a social ecological model of resilience.

Four of the six SERS factors (coping ability, emotional flexibility, self-kindness and common humanity) could be classified as individual strengths. Essentially, coping is the process through which an individual handles stresses, challenges, and threatening demands (Lazarus & Folkman, 1984). This is consistent with previous literature that how a person copes and reacts to adversity constitutes the critical component in a resilience model (Leipold & Greve, 2009). In addition, the findings revealed that emotional flexibility contributes to the SERS' emotion-related domains. Interestingly, most retained items in the emotional flexibility dimension fall into "recovery from negative emotion". This may further affirm that in the dynamic emotional processes, the ability to bounce back from negative emotions during undesirable circumstances is critically important when constructing a social ecological conception of resilience.

The other two factors, self-kindness and common humanity, are both sub-components of self-compassion. Importantly, self-compassionate individuals tend to understand their own emotions (Neff & McGehee, 2010), which is essential for making sense of and bouncing back from negative experiences. In our study, interestingly, while the self-kindness and common humanity items were retained in the final model in CFA, items related to self-acceptance were rejected. These results may be culturally related. Despite Neff's (2003) understanding of self-compassion being acts of self-kindness and self-understanding and not of harsh self-judgement, Zhao et al. (2021) found that young people in a Chinese collectivist culture devalued "self-acceptance and self-kindness" and valued "a sense of shame" and "a higher level of self-criticism". These young people considered "self-acceptance" a way of making excuses for one's mistakes. On the other hand, they maintained that "a sense of shame" and "a higher level of self-criticism" would help them critically reflect on failures and learn from their flaws and inadequacies, enabling them to make progress. Indeed, they generally considered self-criticism helpful for making improvements, self-

reflection, and problem-solving. To conclude, it is no wonder that Chinese family members in this study included “self-kindness” and “common humanity” in the construct of self-compassion, which contribute to building resilience while excluding “self-acceptance” from the framework.

Apart from the strong emphasis on the individual domain, the other two SERS factors belong to the external support received from family and social networks. The results also indicated that the dynamic process of resilience could be operationalized within the context of a broader and inter-relational framework (Luthar et al., 2000). Our findings revealed that nearly half (18 of 44) of the SERS items are relevant to family support, endorsing our belief that family support is a critical component constituting Chinese individual family members’ social ecological resilience (Black & Lobo, 2008). In addition, social support items were retained, which may imply that the support received from social networks is also important in enhancing an individual’s ability to deal with life’s difficulties. Given the significant weighting on family and social support in the factor structure, our results further highlight that individual, family and interpersonal domains are all important contributors to an individual’s resilience.

Theoretical and clinical implications

This study has both theoretical and clinical implications. Theoretically, since social ecological resilience is a relatively novel concept in the resilience field, this study is the first attempt to theorize the components that constitute resilience in Chinese families and develop a resilience scale from a social ecological perspective. Unlike previous resilience-related studies, our study pioneers the adoption of a social ecological perspective to include family and interpersonal factors to disentangle the multiple dimensions of resilience in a Chinese family. Regarding clinical implications, frontline practitioners can use the SERS as a clinical tool to assess individual family members’ overall resilience and develop treatment plans to enhance the ability of certain social ecological factors in the family members. In terms of family interventions, the SERS can serve as an effective outcome measure to evaluate whether family members have attained any changes in interpersonal and intrapersonal strength to overcome adversities in the family and other contexts.

Limitations and future research direction

Despite these contributions, the study has several limitations that need to be addressed in future research. First, most study respondents were in middle adulthood ($M = 44.55$), and their family concerns could be quite different from those of young or older adults. In addition, since Integrated Family Service Centre users likely experienced different types of family

issues, there could be sampling bias limiting the representativeness and generalization in different family groups. Third, respondents' data were divided equally for Exploratory Factor Analysis and Confirmatory Factor Analysis, respectively. Cross-validation of the scale could be undertaken using different data samples for a more rigorous analysis. Future studies can explore whether the SERS can be used in other culturally diverse family groups and identify the mechanisms through which social ecological resilience can benefit individual and family wellbeing.

Conclusion

This study adopted a social ecological model to conceptualize resilience and attempted to validate a social ecological resilience scale in the context of Hong Kong families. A SERS scale with 44 items and six factors was developed. This is one of the few studies to systematically explore the construct of resilience from a social ecological perspective. This newly developed scale can be used to identify where intervention by family workers in Hong Kong is needed and has the potential for adaptation for use in other Chinese communities.

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Declaration statement

The authors declare no conflict of interest in this study.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available upon reasonable request.

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