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AGE DIFFERENTIALS IN INVOLUNTARY MIGRATION-INDUCED DISTRESS

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A DISSERTATION

Submitted to the graduate faculty of The University of Alabama at Birmingham,
In partial fulfillment of the requirements for the degree of
Doctor of Philosophy

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AGE DIFFERENTIALS IN INVOLUNTARY MIGRATION-INDUCED DISTRESS

Juan Xi

ABSTRACT

This study examined potential age differentials in stress resulting from the involuntary migration of 1.3 million Chinese in China's Three Gorges area.

Lifecycle theory, maturity theory, cohort effect theory, and stress process theory were used to guide the research. Alternative hypothesis with regards to age differentials in stress derived from the four different theories were tested.

A pre-migration survey conducted in 2003 provided the data for the study. The survey relied on the multi-stage stratified sampling method and produced a sample consisted of 975 designated migrants and 555 non-migrants (which serves as the comparison group) selected from the same region.

Significant age differentials in migration effects were noted in the analyses. The involuntary migration had a significant negative effect on the oldest age group, but had little effects on migrants of younger age groups. These differentials, however, were reduced but not eliminated after controlling for stress process variables, social demographic variables, and other stressors.

The observed age differentials in the migration effect resulted from a combination of direct and indirect effects. Anticipation of the forced migration exerted not only a greater direct stressful effect on old designated migrants than on their younger counterparts, it also weakened the social and psychological resources of older migrants more so than it did that of the younger migrants. The study confirms the wisdom of lifecycle theories that what is considered a good move for people of one age may be

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viewed as a bad move by people of a different age. In addition, it reaffirms the long-held sociological wisdom that whether a stressful event would result in a stress outcome is contingent upon the social position and the resources of those who are exposed to the event.

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LIST OF ABBREVIATIONS

TGP	Three Gorges Project
VIF	Variance Inflation Factors
WDRD	Wanxian Relocation and Development Region

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CHAPTER 1

INTRODUCTION

While there are many studies which have examined the mental health of migrants (e.g., Beiser 1999; Handlin 1951; Hull 1979; Kuo 1976; Vega et al. 1987; Kuo and Tsai 1986; Magwaza 1994; Ben-Sira 1997; Lev-Wiesel 1998; Rumbaut 1991; Wickrama et al. 2002) and that of the elderly population (e.g., Kessler et al. 1992; Mirowsky and Reynolds 2000; Mirowsky and Ross 1992, 1999; Schieman et al. 2000; Wade and Cairney 1997), there is little research focusing on the age differentials in the effect of migration on depression. Because the elderly is underrepresented in the voluntary migration process, we know very little about whether or not migration has a greater adverse effect on the mental health of the elderly than their younger counterparts. This study addresses a neglected topic: when people of different ages are forced to migrate, are there age differentials in the mental health outcome associated with forced migration?

Age and Depression

Mental health in the elderly is a topic that draws a lot of research interest. However, there is no consensus about the age differentials in depression. While some researchers maintain that depression is more prevalent among older people than either young or middle-aged people (Kessler et al. 1992; Mirowsky and Reynolds 2000; Mirowsky and Ross 1992, 1999; Schieman et al. 2000; Wade and Cairney 1997), others have found that people of older ages are less likely than their younger counterparts to be

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victims of depression (Aneshensel, Frerichs, and Huba 1984; Feinson 1985a; Newmann 1989; Turner, Noh, and Levin 1985). Some researchers have found no association between age and depression (Feinson 1985a, b) and have called depression in old age a scientific myth.

To understand this scientific myth, some researchers argue that although people of different ages are exposed to different stressors, whether or not these stressors actually lead to distress depends on the social and psychological resources they possess to cope with the stress. Thus, the inconsistency in past findings is due to differences in stressors as well as differences in the resource factors being used as controls (e.g., Mirowsky and Ross 1992; Schieman et al 2001).

However, there is an alternative way to look at the issue of age differentials in depression. There are situations in which people of all age groups face the same stressor. For example, wars, natural disasters, economic depressions, and project-induced forced migrations subject people of all ages to the same adverse conditions. Does the same stressor affect people of different ages differently? Unfortunately, we do not have an answer to this question. In this study, our interest is to detect whether there are any age differentials in depression when individuals of different ages face a common stressor: the impending forced migration-induced by a large scale dam project—the Three Gorges Project (TGP) in China.

The TGP-Induced Involuntary Migration

After decades of heated debate, China's National People's Congress approved the Three Gorges Project in 1992 and began the construction in 1994. When completed it

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will be the largest dam in human history. The three stated purposes of the TGP are flood control, generation of electricity, and improved navigation, with flood control being of foremost importance (Lei 1998; Tao 1994). However, according to official estimates, the dam and the reservoir would completely or partially submerge 20 counties and cities and 356 villages in Hubei and Sichuan Provinces (Tao 1994). At least 1.3 million residents of various ages must be relocated (Tao 1994). Unofficial estimates of the number of displaced persons exceed 1.9 million (Dai 1998; Qi 1998; Wu 1998). The number of people who must be relocated is unrivaled by similar projects (Cernea 1993b). Since it has been well documented that migration is a stressful life event that affects the psychological well-being of those involved (Beiser 1999; Handlin 1951; Hull 1979; Kuo 1976; Vega et al. 1987; Kuo and Tsai 1986; Magwaza 1994; Ben-Sira 1997; Lev-Wiesel 1998; Rumbaut 1991; Wickrama et al. 2002), the effects of this TGP-induced migration on the mental well-being of the displaced Chinese are expected to be extensive. Because the TGP affects people of all age groups, it represents a good opportunity to study the age variations in mental health effect of migration.

Migration and Depression

Migration has long been seen as a stressor that affects migrants' psychological well-being (e.g., Handlin 1951; Hull 1979; Kuo 1976; Vega et al. 1987; Kuo and Tsai 1986; Magwaza 1994; Ben-Sira 1997; Lev-Wiesel 1998). However, there are several limitations that keep this body of literature from being able to address the problem convincibly.

First, the pre-moving stress is often left unaddressed. Theoretically, the complete

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process of migration should include three stages: pre-moving preparation, moving and post-moving readjustment. Stress results not only from the actual experience of changes and the often demanding post-migration readjustments, but also from the anticipation of the changes. Most migration, be it voluntary or involuntary, is a planned process. The impact of it, therefore, does not begin at the point at which the new life starts, but begins at the time at which the individual realizes that a move is imminent. The impending move, when accompanied by uncertainties of the migration outcome and the expected costs associated with the move (e.g., Pratto and John 1991; Shiffrin 1988), will be very stressful. Thus, the pre-moving stage can be more stressful than the actual moving process and the post-moving adjustment.

Most studies of migration-mental health association, however, focus on the post-moving stress and the life adjustment in the new place of residence. Few studies look at the pre-moving stress. The reason for this oversight lies in the methodological difficulties. In most cases, it is impossible for researchers to get a representative sample of individuals who are preparing to move and measure the pre-migration stress directly.

Moreover, researchers actually have been often forced to rely upon the ex post facto research designs (e.g., Chiswick 1978). Retrospective measures create challenges for measuring migration effects. It not only make the direct study of pre-migration stress impossible, but also weaken the accuracy of such measures because of the faulty memories as well as because of the tendency for migrants to make post factum rationalizations of past and current conditions and behaviors (Campbell and Stanley 1966).

Even when the migration effect is properly measured, the selective nature of migrants (Borjas 1987; Jasso and Rosenzweig 1990; Portes et al. 1992) challenges the ex-

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planation of the migration effects. Because migrants are often selective, it is problematic for researchers to attribute observed changes in migrants' psychological well-being to "migration effects" because such effects may be confounded with migration selectivity (Liberson 1985).

Finally, contemporary migration research focuses mainly on voluntary migration and its determinants (Jasso et al. 2000). A small body of literature on involuntary migration does exist, but it is mainly about political refugees and victims of natural disasters (Durkin 1993; Eaton and Garrison 1992; Grant et al. 1997; Najarian et al. 1996; Portes et al. 1992). There is little study on project-induced relocation. Unlike political refugees or victims of natural disasters, project-induced relocatees are scapegoats of the government's planned actions (Guggenheim and Cernea 1993; Scudder and Colson 1982). They have to face the impending migration long before the relocation take place. In addition, because project-induced involuntary migration is often imposed upon the powerless people in poorer regions mainly for the benefits of people in more wealthy regions, it invoke a sense of injustice that is normally not an issue for refugees and disaster evacuees (Albrecht 1995; Cernea 1993b; Murdock et al. 1999). Feelings of injustice should affect relocatees' psychological well-being (Alwin 1987; Mirowsky and Ross 1986). As a result, findings from past studies may not be readily generalizable to project-induced involuntary migrants.

The TGP provides an ideal research condition to overcome all these challenges. The construction of the dam and the reservoir requires the relocation of all those who are in the way on a non-selective basis. This allows us to measure the migration effect free of confounding selectivity. The inclusion of migrants of all ages also enables us to examine

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age variations in migration's mental health effects. Moreover, the TGP as a scheduled event permits us to conduct pre-migration surveys to measure directly the impact of pre-moving stress on mental health. The possibility of gathering prospective migration data presents an unusual opportunity students of migration can only dream of (e.g., Jasso et al. 2000).

The TGP-Induced Impending Involuntary Migration as a Stressor

Project-induced migration is usually stressful because of its anticipated negative economic and social consequences. Economically, migrants displaced by a developmental project often become homeless, landless, and jobless in the process (Scudder and Colson 1982). Most of the designated migrants in the Three Gorges region are expected to experience the same adversities. China is known for its high agricultural density and labor-intensive farming (Brown 1995; Zhu 1996, 1999). Farmers in the region average one *mu* (1/15 of a hectare) of farm land per capita. The TGP is expected to submerge 25.9 thousand hectares of mostly fertile farmland located along the river basin. Given the severe shortage of farmland, it is estimated that 40% of the affected farmers will be ousted from farms and forced into occupations for which they have neither the skills nor educational qualifications (YVWRPB 1999).

The likelihood that ousted farmers will be absorbed by non-farm industries as promised by the government is slim because factory jobs are scarce in this region (Li 1998; Tao 1994; Zhu 1996). Although there have been government-orchestrated efforts to create factory jobs by luring new businesses to the region, they have been largely proven unsuccessful (People's Daily 1997). A New York Times (1999) article reports that be-

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cause of the lack of factory jobs, many displaced farmers have become jobless and are forced to survive on meager government allowances of $8.50 a month.

Involuntary migration in the Three Gorges also has grave social ramifications. According to a recent study, long-term residents account for 99% of the Three Gorges' population (Zhu 1996). The forced relocation is likely to be socially disruptive for a population which is so deeply rooted in this stable social network. Despite a majority of designated migrants preferring to resettle in a place close to their old home (Zhu 1996), most of them are expected to be forced to relocate to a place afar or to a different province due to the severe shortage of farmland in the region (Tao 1994). Furthermore, similar constraints at resettlement destinations and logistic considerations necessitate breaking up many larger villages and sending villagers of the same clan to different destinations in fragmented units. Thus, the process of relocation will not only uproot the migrants from their home for many generations, it will also tear apart their existing social networks.

There are a few previous studies describing the expected financial and psychological costs of the TGP for migrants. They revealed that the migrants worried a lot about the impending forced relocation. The majority of the migrants believed that the TGP migration would hurt their family (Xi et al. 2004). They anticipated a drastic decline in their family incomes and a lower standard of living in their new homes (Ding 1998; Li and Rees 2000; Zuo 1997). They expected worse and unfamiliar working conditions (Ding and Zheng 1992). They worried that they would have no one to turn to in times of trouble after the move (Ding and Zheng 1992). They also felt sad when thinking of leaving the land of their ancestors (Huang 1998). Besides these reported concerns, another stressful

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aspect of the impending TGP migration is that it is involuntary. Migrants have to comply with the relocation decision that has been imposed upon them. Further, there is no hope for them to return home regardless of the migration outcome. A more recent study on the TGP migration clearly indicates that migration status is a robust and strong predictor of depression even after controlling for demographic variables, other stressors, and resources and copings (Hwang et al. 2005). Therefore we believe that the impending involuntary migration is an important stressor that is faced by all those who are designated to be relocated and that it will negatively affect the migrants' psychological well-being. In this dissertation study, our interest lies in the age differentials in the effect of this specific stressor on mental well-being. The aim was to measure the psychological impacts of the pre-moving stress of the TGP involuntary migration on migrants of different ages by using non-migrant residents of the same region as a comparison group.

Depression as Stress Outcome

While stress manifests itself in many forms and has been operationalized differently in different disciplines, sociological studies of stress have focused predominantly on depression. In this dissertation study, we chose to focus on depression as the stress outcome for several reasons: (1) depression symptoms are the most common form of psychological distress (Turner and Lloyd 1999; Kessler et al. 1994); (2) this dimension represents the primary subjects of much of the available contemporary research; and (3) depressive symptoms are associated with wide ranging social consequences, including increased risk of substance abuse (Schoenborn and Horn 1993), and impaired performance in work and parenting roles (Lyons-Ruth et al. 1986; Oliver and Berger 1992).

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Summary of Chapters

Although we expected that the impending involuntary migration was an important stressor that was faced by all age groups and that it was likely to negatively affect the migrants' psychological well-being, migrants of different ages might experience it differently. We would review four theoretical perspectives that suggest why there should be age variations in the TGP migration-induced depression in Chapter two. Chapter three introduces the Data and Measures used in the analyses. Chapter four examines the between-and-within-group age differentials in the effect of the TGP migration on depression. Finally, in chapter five we summarize the results and discuss the findings.

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CHAPTER 2

OVERVIEW OF THEORY AND HYPOTHESES

Should the TGP-induced migration affect people of different ages differently? Are older people affected by the migration more adversely or less adversely? Different perspectives on age suggest different answers. *Life-cycle theory* predicts that because people at different life cycle stages have different needs, the impending migration has the potential to meet the needs of the young but is likely to frustrate those of the old. As a result, the migration could be more stressful to the old than to the young adults. *Maturity theory*, however, suggests that, because of the trait of maturity of human life, people of older ages are generally more composed and experienced. Therefore, they may not perceive the TGP migration as stressful as their younger counterparts. Moreover, *cohort effects theory* suggests that, because old generations of Chinese are accustomed to government-orchestrated movements, the TGP migration would be perceived as less stressful by the old than by the young adults. Finally, in contrast to viewing the TGP migration as a stressor with different effects on migrants of different ages because of age differentials in perception of stress, *stress process model* suggests that the age differentials in the effect of migration result from differences in resources and coping strategies, which are distributed unevenly among age groups.

Life Cycle Theory

Life cycle theory maintains that there are several common stages through which

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every individual passes during his/her lifetime: young adulthood, middle-aged adulthood, and old adulthood, and people at different life cycle stages play different roles (Duncan 1988; Hogan 1978; Mirowsky and Ross 1992). As one of the most widely used concepts in social science, life cycle theory has been employed in many fields to explain the age variations in different aspects of human life (O'Rand and Krecker 1990). In literature on voluntary migration, life cycle theory is used to explain the well-known age pattern in migration, which suggests migration is most prevalent among young adults between 20 and 30 years old, with a peak at about 22 years old (Angel et al. 1999; Ritchey 1976; Rogers 1988). Thereafter, rates of migration decrease as age increases except for a slight upturn for those approaching retirement age (Angel et al. 1999; Ritchey 1976; Rogers 1988). Generally, the elderly are less likely than the young to move (e.g. Angel et al. 1999; Ritchey 1976). To explain variations in migration across different age groups, researchers argue that in different stages of the life cycle, people have different needs. Thus, the costs and benefits associated with migration are different for migrants of different ages. Needs that are more compelling for people of some ages may not be equally as important for people of a different age (Abu-Lughod and Foley 1960). Different needs motivate or obstruct migration at different stages of the life cycle (Angel et al. 1999; Ritchey 1976, Rogers 1988). For example, job opportunity is the most compelling need for young adults (Ritchey 1976). Their high rates of migration reflect the process of job search and experimentation in the early working years. The most important need of the later stage of human life, in contrast, is assistance or care (Rogers 1988; Angel et al. 1999). Deterioration in physical health and the need for assistance and care usually prevent older adults from moving away from their caregivers (Rogers 1988; Angel et al. 1999). Because the

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TGP-induced relocation is not voluntary, migrants in question cannot decide whether or not to move based on their needs; thus, the impending involuntary migration is likely to be conceived as beneficial for migrants in certain life cycle stages and detrimental for others according to their own life cycle defined needs.

The often observed age variations in migration parallel the division of the life cycle stages: early adulthood, middle adulthood, and old adulthood (Duncan 1988). This division also takes into account the general family life cycle stages: pre-child and child-bearing stage, child-rearing stage, and post-child stage (Abu-Lughod and Foley 1960; McAuley and Nutty 1985).

Early Adulthood

Early adulthood includes young adults in their late teens to early 30s who are single and have no children or have pre-school-age children. People in this stage of the life cycle are found to be most active in migration (Abu-Lughod and Foley 1960; Ritchey 1976; Rogers 1988). As mentioned previously, job-career opportunity is the most compelling need for these young adults. Finding better paying jobs is the most important factor that motivates young adults to move. Studies have consistently shown that economic motivations are directly related to young adults' migration (e.g., Rieger 1972).

Although the TGP migration is involuntary, the comparative potential to satisfy the job-career needs in the Three Gorges area and designated places for resettlement can shape the way these young migrants perceive the relocation. The Three Gorges area is an isolated mountain area with few jobs and little economic development. Because of the long debate over the TGP, for decades, the central government has withheld investment

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to this area. As an example, Wanxian Relocation and Development Region, which covers more than two thirds of the inundated area, received only 6.1 billion Yuan investment from the Central government from 1949 to 1990, which means 1.62 Yuan (about $0.20) per capita per year (Ouyang and Jiang 2002)[1]. As a result, the Three Gorges area has long been an underdeveloped area with inadequate infrastructures, which in turn hindered its economic development (Wei 1999). For example, in 1998, the GDP per capita for Wanxian Relocation and Development Region was 2,506 Yuan; in contrast, the GDP per capita for the nation as a whole was 6,251 Yuan, and the corresponding figure in costal regions was more than 10,000 Yuan (Ouyang and Jiang 2002).

Agriculture dominates the Three Gorges area. Most people make a living from farming, fishing, orchards, and husbandry. Low income drives many young adult Three Gorges residents to seek non-agricultural jobs in big cities and costal areas as labor migrants (Hwang et al 2004). In contrast, the resettlement places for many TGP migrants are located in better developed provinces along middle- and lower-reaches of the Yangtz river, or costal areas. Some resettlement locations are villages close to middle-sized or big cities, some are within urban areas (Wang and Zhou 2001). Thus, to those young migrants, the impending migration is seen as a rare opportunity to advance their occupational career (Li 1996, Li and Rees 2000). Their attitudes towards the impending relocation are found to be much more positive than those of the old migrants (Li 1996).

Middle Adulthood

When adults enter the childrearing stage, family development and child rearing,

[1] Under the central-planned economic system, the central government's investment determines the level of economic development in a region.

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besides career, become the most compelling needs (Abu-Lughod and Foley 1960). While young adults who either do not have children or have pre-school age children can easily move to places where they can find better jobs or have the preferred lifestyle (Abu-Lughod and Foley 1960; Ritchey 1976), middle-aged adults with school-aged children usually choose to settle down in places where the needs of their children, such as better schools and safer communities, can be better served (Abu-Lughod and Foley 1960). As children grow older, middle-aged adults' ties to the community grow stronger as they make more social and emotional investment into the community (Guest and Lee 1983; Hummon 1992; Ritchey 1976). They are more established in the labor force (Ritchey 1976). Middle-aged adults' economic and social resources become more and more localized (Brown 1989; Cuba and Hummon 1993). Each of these factors is an impediment to migration (Ritchey 1976).

Although the impending migration induced by the TGP is involuntary, it does not prevent these would-be migrants from making a cost–benefit evaluation based on their needs vis-à-vis the potential that these needs can be met in their current vs. their future place of residence. Previous studies suggest that the middle-aged migrants care more about the life chances of their children than other things (Li 1996; Li and Rees 2000). The designated places for resettlement are generally perceived to be able to provide better education opportunity and other life chances important to those who have children (Li and Rees 2000). Designated places for resettlement generally have better education facilities and opportunities than those of the Three Gorges area. Some rural communities in the Three Gorges area are located in isolated mountains with inconvenient transportation. In some places, children have to walk miles of mountain trails to go to school. Some places

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do not have TV network or other access to outside information.

In addition, for rural residents who would be relocated to an urban destination, the impending migration represents an once-in-a-lifetime opportunity for spatial upward mobility. In China, the urban/rural difference has been the most important social distinction for half a century (Potter and Potter 1990). The difference is perpetuated by China's Hukou, or household registration system (Cheng and Sheldon 1994; Fan 1997; Oi 1993; Solinger 1999). Household registration is an ascribed status determining the life chances of every Chinese person (Solinger 1999). Every household is classified as either an "agricultural" or a "non-agricultural" household according mainly to the place of residence of the household head. Non-agricultural households, usually urban residents, are entitled to quality education, urban employment, public housing, subsidized medical services, and retirement benefits. In contrast, members of agricultural households, who mostly live in rural areas, are "second-class citizens" deprived of most of these benefits (Solinger 1999; Yang 1993). Generally speaking, in China's unique stratification system, non-agriculture household registration generally means better life chances, which are attractive to those middle-aged migrants who are concerned about their children's futures. In sum, although middle-aged migrants are not as footloose as younger migrants due to their more entrenched social and economic ties with the community, they may perceive that moving out of the Three Gorges area is good for the future of younger generations (Li 1996, Li and Rees 2000).

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Old Adulthood

For the elderly, job career opportunity is no longer an important consideration at this stage of life cycle. They are less likely than their younger counterparts to migrate for economic reasons as their remaining years in the labor market are limited and their employability is low (Ritchey 1976). As shown by some researchers (Mirowsky and Ross 1999), older people have higher levels of financial satisfaction even though their income is less than that of their younger counterparts. At this stage of the life cycle, the children have grown up and left home. Now the most compelling needs for the old adults are physical assistance and emotional care, which they usually can draw from their social network (Pearlin and Skaff 1996).

Poor health and physical impairment are prevalent strains in later life (Pearlin and Skaff 1996). The incidence and prevalence of chronic disease increase with age at an accelerating rate (Collins 1988; Hartunian, Smart, and Thompson 1981), as does the average level of dysfunction (Waldron and Jacobs 1988). These age-linked physiological processes can erode subjective health accordingly (Johnson and Wolinsky 1993). According to several voluntary migration studies (Cribier 1980; Findley 1988; Pampel, et al. 1984), declining health status is an important reason for the immobility found among the older age groups (Findley 1988). Poor health leaves the older people less capable of moving and makes the migration a very difficult task for them.

Older people are also more dependent on their social networks from which they draw support (Pearlin and Skaff 1996). Migration for old adults means severing ties that have taken them a lifetime to build. Thus, it is no wonder that elderly are more reluctant to move, and that when they move, they are more likely move to rejoin their families

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(Portes and Rumbaut 1990; Wilmoth, Dejong and Himes 1997) or seek better care than for other reasons (Longino 1981; Wiseman 1978; Bonaguidi 1986; Findley 1988; Rogers 1988; World Health Organization 1984). Because the TGP-induced migration is not aimed at helping elderly to move to their caregivers or to family members who live elsewhere, the process is thus more likely to disturb the existing social ties rather than strengthen them. It can frustrate the old migrants' needs for assistance.

Moreover, older people's emotional needs are usually different from those of the young. For example, older people often have a stronger sense of belonging than do younger people—a significant affiliation of self with the place of residence (Cuba and Hummon 1993). Research on neighborhood or community attachment documents that attachment to a particular locale grows in strength over time (Brown 1989; Guest and Lee 1983; Hummon 1992). As people age, they root themselves deeper into the community. The financial, social, and emotional ties they accumulate over their lifetimes inter-weave with the community in which they live. Even after their children have left home, their friends, and their lives are still in the community. Community identity has become part of their self-identity (Cuba and Hummon 1993). Migration from a life-long place of residence at old age is an uprooting process that means being cut off from economic, social and emotional ties that individuals accumulate in their lifetimes. It can be very painful. Most dramatically, studies of involuntary migration, whether from urban renewal (Fried 1963), or natural disasters (Erikson 1976), indicate that individuals who are torn from deep-rooted places are likely to experience severe emotional grief and a profound sense of displacement (Cuba and Hummon 1993). According to a recent study, long-term residents who have been living in the Three Gorges area all their lifetimes, account for 99%

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of the Three Gorges' population (Zhu 1996). The impending TGP migration as a forced migration can threaten the sense of belonging of the old migrants and affect their mental well-being.

In addition to the sense of belonging, as people age, they are more sensitive to any instability of their community and neighborhood environments (Pearlin and Skaff 1996). Older people are accustomed to their community environments and hope to keep these environments intact. When their living environments change, they feel stressed (House and Robbins 1983). The ability to handle changes declines with age (House and Robbins 1983). The impending involuntary migration can heighten feelings of vulnerability because unfamiliar surroundings at the place of resettlement can evoke a keener sense of their own encroaching frailties. This may particularly be the case when migrants have to move away from their network members (Pearlin and Skaff 1996).

Furthermore, in contrast to young people who usually are easily attracted to the modern culture and lifestyle, old people usually prefer the lifestyle they are already accustomed to (House and Robbins 1983). They are more likely to experience nostalgia for the past and prefer to keep things the way they were, even when the old days were not necessarily so good (Pearlin and Skaff 1996). Readjustment to a new lifestyle means great challenges and can be a mental burden to them. Because of the long period of low mobility in China, older people here have spent all their lifetimes in the Three Gorges area (Huang 1998). They are accustomed to the slow and quiet lifestyle of the traditional mountain society, with everyone knowing each other in the community. The impending involuntary migration will expose the elderly to a new dialect, new lifestyle of flat-land communities, and new culture. Because of their lower adaptability to these new things

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(Angel et al. 1999), the impending involuntary migration is expected to be most challenging.

Finally, Chinese culture emphasizes the attachment to ancestral land and graveyards (Huang 1998). The land left by the ancestors is part of the foundation of family and clan identity. Migration has long been an emotionally loaded word in Chinese culture. For thousands of years, Chinese did not choose migration unless they were forced to. Even if they moved, the ancestral land and graveyards were still perceived as the places where their roots were and where they should be buried after they died. Although industrialization is likely to have eroded this tradition to some degree, recent studies indicate that this traditional notion of migration is still deeply rooted in the hearts of people living in the less developed parts of China, such as the Three Gorges area, especially for the elderly (Huang 1998). For these old migrants, the impending involuntary migration foretells loneliness because of the anticipated separation from the spirit of ancestors, a situation which will be very difficult for them to deal with.

Thus, life cycle theory suggests that people have different needs in different life cycle stages. The TGP migration promises that needs of younger adults would be better met elsewhere whereas needs of older adults would be more likely to be frustrated if they move. As a result, the impending involuntary migration can be perceived as stressful to some age groups but not to others. Better job opportunities prevalent at the designated places for resettlement are likely to make such destinations more attractive to the younger TGP migrants. These younger adults have not invested in as many community ties as their older counterparts. In addition, the impending migration presents them a rare opportunity to explore the new life outside the Three Gorges area. Thus, the impending migra-

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tion seems to mean more of a promise rather than a sacrifice for career-conscious younger adults. The impending involuntary migration costs more to middle-aged migrants than to the younger migrants. However, because the well-being of their children dominates the preoccupations of the child-rearing adults, the perceived better life chance in designated places for resettlement can make the impending relocation less stressful for these middle-aged adults. To the old migrants, job consideration is no longer important. In addition, they are rooted deeply in the current communities and depend more on their network in the current community. They have grown accustomed to their current life circumstances and lifestyles and prefer stability over change. The impending involuntary migration means a stressful uprooting process for them.

Based on the life cycle stage view, it is expected that there will be age differentials in migration-induced depression. Other things being equal, the impending involuntary migration as a stressor will have the smallest adverse mental health effect on the young, but have the greatest adverse mental health impact on the old.

Life cycle stage theory views age in terms of life cycle stages. However, different conceptualizations of age can lead to rather different predictions of age differentials in distress. Two alternative perspectives based on different conceptualizations of age are discussed below.

Maturity Theory

Besides being viewed as a proxy for life-cycle stage, age is also commonly considered as a one-way progression of improvement—a summation of experience (Mirowsky and Ross 1992, 2001). This perspective states that as people grow older, they

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gain more experiences and composure and have more positive self-concept (Demo 1992; Gove, Ortega, and Style 1989; Mirowsky and Ross 1992, 2001). This perspective is derived from theories of human development which, in turn, descended from Freud's theory of psychosexual development. As suggested by Erickson (1964) and embraced by Levinson (1978), human life moves through developmental stages, which are inherently progressive, by solving competing inner conflicts, and finally reaches a sense of continuity that seems to transcend both time and life. Early and middle adulthood is characterized by concerns with self-achievement and forming a family. In old age, persons are more reflective and composed, where they have become comfortable with themselves and can be wise with their life environments (Buhler 1935; Jung 1958; Levinson 1978; Neugarten 1977).

Although the maturity theory is originally developed in the field of psychology, there is also support for this perspective within the sociological realm (Gove et al. 1989; Mirowsky and Ross 1992, 2001; Ross and Drentea 1998). As shown in sociological literature, older age brings a general evenness in temper. Old people are more composed and report feeling less worried, frustrated, tense, restless, angry, or annoyed (Mirowsky and Ross 1999). Older adults are found to rate themselves as more helpful, supportive, disciplined, able, and satisfied with life (Campbell, Converse and Rodgers 1976; Gove, Ortega, and Style 1989).

The TGP-induced migration as a forced process can easily provoke the feeling of unfairness, environmental injustice, anger, and hopelessness among migrants (Huang 1998; Wei 1999; Wu 1998) because these migrants are the victims of powerful external forces (Cernea 1993a, 1993b). Emotional stability and balance of the older migrants may

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help them manage the negative emotion and reduce the mental impact provoked by the impending involuntary migration. Thus, they may not view the impending migration to be as stressful as younger migrants do.

Individuals not only learn how to handle their disposition, but also learn how to handle their situation, leading to predicted increased manageability and wisdom over time (Mirowsky and Ross 2001; Ross and Drentea 1998). Older adults tend to have general skills learned from solving problems in the past (Mirowsky and Ross 2001). They may have figured out strategies that work and learned to avoid those that do not, and may have increased confidence in their ability to solve problems (Mirowsky and Ross 2001; Ross and Drentea 1998). It is noteworthy that, in both the East and the West, wisdom is perceived as an attribute of the elderly (e.g., Clayton ad Birron 1980; Jung 1958; Levinson 1978). Based on this reasoning, we expect that older migrants' greater stock of life experience may help them solve the problems related to the impending involuntary migration.

According to maturational perspective, greater maturity, experience, and composure are related to less depression (Mirowsky and Ross 2001). These human traits may reduce the stress level of the impending involuntary migration for older migrants. According to this perspective, the impending involuntary migration as a stressor will have the smallest adverse mental health effect on the old, but have the greatest adverse mental health impact on the young.

Cohort Effect Theory

As argued by Ryder (1965), people born in different times are shaped by the

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unique social circumstances along with those who are born in the same time interval and aging together as a cohort.

Brought into sociology by Mannheim one hundred years ago, the concept of cohort is still of great interest to sociologists (Easterlin 1987; Glenn 1976; Pampel and Peters 1995; Ryder 1965). According to Ryder (1965), a cohort is defined as the aggregate of individuals who experienced the same event within the same time interval. Each cohort has its unique location in the stream of history and embodies a temporally specific version of the heritage. Successive cohorts are differentiated by the changing content of formal education, peer-group socialization, and idiosyncratic historical experience. As a result, each cohort has a distinctive character reflecting the circumstances of its unique origination and history (Easterlin 1987; Pampel and Peters 1995; Ryder 1965).

Cohort theory guides us to look at the similar experiences shared by members of the same generation. Chinese born before the 1950s have experienced the war against Japanese invasion and the civil war. They are also the generation who built the communist society, whose basic ideology is state-centered and collective-oriented (Zhou, Tuma and Moen 1996). They have shed blood for the communist dream, or have lost loved ones to gain the legibility of the communist ideology. They should not oppose the TGP which is a typical government behavior based on collective-oriented ideology.

Those born in the 1950s and 1960s were brought up during a historical period of the exuberance of communism. By formal education and peer-group socialization, they have been trained to obey governmental orders and are accustomed to suppress personal interests for the collective interest of the state (Zhou, Tuma and Moen 1996). Because experience in the past can help people adjust to similar problems in the present (Elder and

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Liker 1982), these experiences are likely to make older migrants view the impending involuntary migration as a worthy cause, and thus to reduce the stress associated with it.

Moreover, migrants in their 50s and 60s were young adults in the 1960s and 1970s who participated in China's nation-wide movement of rustification when high school graduates were sent to remote areas of China and villages for reeducation (Zhou and Hou 1999). During that time, over 20 million urban high school graduates were forced to move to rural areas (Zhou and Hou 1999). People in this generation have experiences surviving forced migration in the past. These experiences give them an advantage over younger migrants in coping with the current forced migration.

On the contrary, young migrants who were born in the 1970s or later belong to the cohort that grew up during the post-Mao period, a period characterized by profound social transformation both economically and ideologically in China. These generations have been called "broken generations" because the traditional social value system and communist ideology have broken up during this time (Ouyang 2006). Not only was the economic system being transformed from planned economy to a market one, the ideology, culture, and lifestyle were also reshaped to match the market economy development (Wei 1999). During this time, China opened herself to the outside world after several decades of isolation. Western culture and lifestyles rushed into China and eroded the communist ideology in many aspect of life. Growing up in this poly-ideology and poly-lifestyle period, this cohort is familiar with the notion of personal choice, self-fulfillment, and liberty. Most of them are also the only child in their family because of the one-child policy. They are the "little emperor of their family" and much more self-centered than their parents and grandparents. They are less likely to welcome an impending relocation ordered by

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the central government. We expect that migrants who belong to this cohort will experience more emotional distress because it is harder for them to rationalize the forced migration because of the governmental order.

In short, the cohort perspective suggests that because the older generations grew up during a historical period when the zeal of collectivism overwhelmed personal interests, there is going to be a cohort effect separating migrants in their 50s and above and migrants under 30 in their reaction to the TGP and its induced migration. Based on this perspective, we expect that the impending involuntary migration as a stressor will have the smallest adverse mental health effect on those above 50, but have the greatest adverse mental health impact on those under 30.

Considerable research on distress has pointed out that, there are few objective social situations that are stressful to everybody, instead, the meaning of these social conditions that are perceived by different people are keys to explaining the outcomes of life events (Wheaton 1990). Although the life cycle stage theory, the maturity theory and cohort theory make conflicting predictions about how the mental well-being of migrants of different ages would be affected by the TGP, they all view the impending involuntary migration as a potential source of stress but with rather different meaning for migrants of different ages. They take different views of human life and believe that age differentials in the migration-induced distress are inherent according to the traits of human age. Life cycle theory suggests that different needs associated with different stages in human life cycles determine the levels of stressfulness of the TGP migration. Maturity theory argues that some personal traits progressing with human aging process determine the different levels of stressfulness of the TGP migration. Cohort effect theory indicates that the spe-

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cial historical experience shared by people in the same ages will make the meaning of the TGP migration different to them from that to others. All three perspectives propose that age differentials in the migration effects are result from the different meanings of the migration perceived by people of different age. Thus, according to these three theories, other things being equal, the TGP migration will be more stressful to some age groups than to others. Unlike these three views, the stress process model maintains that when facing the same stressor, such as the TGP-induced involuntary migration, different stress outcomes can also result from different coping resources possessed and coping strategies employed by migrants of different ages. Thus, the stress process model (Pearlin et al. 1981) focuses on the role of a set of factors that work between the stressor and stress outcome.

Stress Process Model

As one of the dominant models in the social sciences, the major tenet of the stress process model is to relate manifestations of stress such as depression to stressors such as undesirable life events, daily hassles, and recurrent life problems. Because distress is not an inevitable outcome for persons exposed to the same stressors, the model invokes mediators to explain the conditional and mediational nature of such associations. Specifically, stress mediators refer to a set of factors that have been shown to alter the effects of stressors on stress outcomes (Pearlin 1989). A stress mediator provides an explanation as to why stressors are not always stressful. Most empirical studies of stress have focused on resources and coping strategies as stress mediators. The stress process model suggests that because people of different ages usually possess different coping resources and use

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different coping strategies, age differentials in stress can result from the same stressor (Pearlin et al. 1981).

There is a growing body of mainly voluntary migration literature which has demonstrated the utility of the stress process model for migration studies (Berry et al. 1987; Ben-Sira 1997; Kuo 1976; Kuo and Tsai 1986; Lev-Wiesel 1998; Noh and Avison 1996; Vega et al. 1987). More recently, the same theoretical framework has been extended to examine political refugees from Southeast Asia (Beiser 1999; Rumbaut 1991; Wickrama et al. 2002). Because project-induced migrants share many similarities with political refugees (Cernea 1993b), it seems logical to apply the same theoretical model that has been proven useful for refugee studies to project-induced migration.

Concept of Stress Mediators

Resources include both tangible and symbolic goods that can be marshaled to counter the adverse effects of stressors. Two types of resources that have been given the most attention are social and psychological resources. Social resources have been most frequently conceptualized in terms of social support, which refers to the perceived availability or actual receipt of informational, instrumental, and emotional support from one's social networks (Lin et al. 1986, 1999).

Social Resources. As a number of reviews have illustrated, there is a substantial body of evidence (Berkman 1984; Cohen and Wills 1985; House et al. 1988; Kessler and Mcleod 1984; Thoits 1995) suggesting that social support is associated with better mental health because it buffers and mediates the damaging mental health impacts of major life

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events and chronic strains. Moreover, evidence from multi-wave community investigations (e.g. Aneshensel and Frerichs 1982; Turner and Noh 1982) as well as from such diverse sources as animal studies, laboratory analogue studies with humans, and intervention studies, makes a compelling case for the causal relevance of social support for depression and for psychological distress generally (House 1981; Turner and Noh 1983).

There is evidence that social support is important for the well-being of people in general and for the aged in particular. Research on the aged shows that social support has important consequences both for physical and for psychological health status (Turner and Noh 1988; Mirowsky and Ross 1992). Research on age differentials in social support also documents a decline in both the quantity and quality of available support networks and resources as people age (e.g., Fischer 1982; Thoits 1982; Turner and Marino 1994). Some studies also report a decline in perceptions of support as people age (Zautra 1983). Because they lack the protection of social support, the older migrants are expected to be more vulnerable to the effects of the impending involuntary migration.

Psychological Resources. Psychological resources are personal characteristics upon which people may draw when dealing with stressors. The most commonly studied psychological resources have been the sense of mastery over one's own life circumstances and self-esteem (Pearlin and Schooler 1978). Sense of mastery refers to "the extent to which one regards one's life-chances as being under one's control in contrast to being fatalistically ruled" (Pearlin and Schooler 1978: 5). Thus, the concept has much in common with the "locus of control" described by Rotter (1966). It is believed that mastery is central among the personal resources on which people draw in the face of threats

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posed by events and objects in their environment, because it influences one's ability to manage life's challenges competently, and is conditioned largely by one's past history of successes and failures in meeting such challenges (Turner 1988).

An impressive number of studies show that a sense of mastery both directly reduces psychological disturbance and buffers or mediates the deleterious effects of stress exposure on mental health, especially on depression (Kessler, Turner and House 1988; Mirowsky and Ross 1990; Pearlin et al. 1981; Rodin 1986; Rosenfield 1989; Thoits 1995; Turner and Lloyd 1999; Turner and Noh 1988; Turner and Roszell 1994). Self-esteem, According to Rosenberg (1965:5) refers to "the evaluation which the individual makes and customarily maintains with regard to himself or herself: it expresses an attitude of approval or disapproval toward oneself." Self-esteem is also repeatedly reported to reduce psychological symptoms, especially depression, and buffers the emotional consequences of stressors as well (Kaplan, Robbins, and Martin 1983; Shamir 1986; Turner and Roszell 1994).

A decrease in sense of mastery and self-esteem over personal outcomes parallels the physical and mental decline as people age (Mirowsky and Ross 1990; Baltes et al. 1990). Because of the historical trends in increased education and the positive effect education has on sense of control, older people are believed by some researchers to have a lower sense of control due to their lower educational attainment (Mirowsky 1995). Based on this reasoning, we suspect that the older would-be migrants may be more vulnerable to the depressive effect of the impending involuntary migration.

Political Resources. In addition to social and psychological resources, there are

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other resources that might safeguard Three Gorges migrants against stress associated with forced relocation. We examine one of these resources that is particularly important in China: political resources. The Chinese are distinctively stratified by the amount of political resources they possess. Cadre or party membership is a political resource of great stratification significance in China. Despite a classless society ideology, class differences were never eradicated in Communist societies (Nee 1989; Rona-Tas 1994; Szelenyi 1983). In fact, party cadres have always been the most privileged class in Communist societies (Djilas 1957). Although market reforms in China have led some observers to predict a weakening of the power and privileges of party cadres (Nee 1989), others maintain that these reforms may have actually enhanced the positional advantages of Communist cadres (Bian and Logan 1996; Rona-Tas 1994; Walder 1995). Some critics of the TGP maintain that because local officials have been delegated undue power to allocate and distribute relocation funds, misuses of these resources by cadres for private gains have occurred frequently (China News Service 2000; New York Times 1999; People's Daily 1999; Wu 1998). This unique stratification feature of China leads us to anticipate that the Three Gorges migrants who are themselves cadres or party members, or who have families or relatives in such positions, will be in a better position to safeguard themselves from the negative impact associated with forced migration stressors. Moreover, in China there is an age pattern in political resources: the middle aged adults usually possess more political resources than do the young adults or the old adults (Jiang 1998). Thus, we expect that middle aged migrants will better safeguard themselves from the negative impact associated with the impending migration than other age groups.

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Coping Strategies. While resources refer to what people have and can potentially draw upon when facing stressors, coping response refers to what people actually do to counteract stressors (Pearlin and Schooler 1978). Coping is commonly viewed as "actions that people take... to avoid or lessen the impact of life problems" and other stressors (Pearlin 1989: 250).

Coping responses have been categorized into problem-focused and emotional-focused coping strategies (Thoits 1995; Folkman and Lazarus 1980). In general, problem-focused coping is centered on changing the difficult situation and is more likely when situational demands are appraised as controllable. Emotional-focused coping is related to managing the meaning of the situation and is more likely when demands seem uncontrollable (Billings et al. 1983; Folkman and Lazarus 1980, 1985; Folkman et al. 1986; Forsythe and Compas 1987; Strone and Neale 1984; Thoits 1991).

Findings with respect to age differences in coping responses are far from conclusive (Turner and Lloyd 1999). Some researchers argue that as they move across the life course, people tend to rely increasingly on the managing of meaning of difficult situations rather than solving the problem (Folkman et al. 1987; Pearlin and Skaff 1996). Researchers have also found that women, people with low education and income, and people with lower sense of control were more likely to employ emotional-focused, rather than problem-focused, coping (Mirowsky and Ross 1995; Pearlin and Schooler 1978). Older populations are more likely to use emotional-focused coping because they tend to have a higher percentage of the female, the less educated, the poor, and those who have a lower sense of control. Although emotional-focused coping is often viewed as less effective than problem-focused coping (Mirowsky and Ross 1995; Pearlin and Schooler 1978),

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it is a more viable strategy when facing a stressor beyond one's control. Because the impending involuntary migration is a stressor that is out of the personal control of migrants, the more effective way to cope with it is probably to manage its meaning. We expect that the older can cope with the stressful impending involuntary migration better and therefore are likely to be less depressed than their younger counterparts.

The stress process model provides us with an alternative explanation that the age-differentiated effect of the impending involuntary migration may not be inherent in the traits of human age, but may result from the different coping resources possessed by different age groups and from different coping strategies used by different age groups. Thus, after we take into account these stress mediators, the difference in the effect of the impending involuntary migration should shrink or even disappear.

Mechanisms of Stress Process

Sociological research of the stress process has focused on the mechanisms by which stress mediators operate to alter the effects of the stressors. Although we refer to resources and coping collectively as stress mediators, we do not mean that they always mediate the effect of stressor on stress outcomes. According to Ensel and Lin (1991), resources not only can directly inhibit distress independent of the presence of stressors (*independent effect hypothesis*), but can also "mediate" between stress and stressors (*mediating effect hypothesis*). Furthermore, because those who are exposed to the same stressor may possess unequal amount of protective resources that buffer some adverse effects of the stressor, it makes sense to expect a conditional relationship between stress and stressors (*interaction effect hypothesis*).

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Independent Effect Hypothesis. Resources can exert an "independent" effect on stress by directly protecting an individual from stressors. Such distress-deterring function need not be triggered by the presence of external stressors. In other words, the presence or occurrence of stressors will not have any implications for the effect of resources on distress. These direct and independent effects of resources on mental health have been repeatedly found to persist, even after their mediating role has been accounted for (Ensel and Lin 1991; Hwang et al. 2005).

The independent effect hypothesis is supported if resources exert a significant negative effect on stress, with or without the stressor. Because of the age variations in resources, and the different meaning of resources to people of different ages, we expect that the direct effect of resources will be age differentiated. Specifically, we expect that resources will have different independent effects for different age groups.

Mediating Effect Hypothesis. The resource mediating effect model suggests that resources intervene in the relationship between stressors and distress. Because protective resources can be mobilized or chipped away by the presence of the stressors, mediating effect model provides an indirect linkage between stressor and stress in two ways: resources are called upon in the presence of stressors to protect individuals from distress, thus they counteract the negative effect of stressors on distress; resources are weakened by the presence of stressors and individuals with fewer resources are more vulnerable to stress. Thus, the mediating effect hypothesis leads to two different models: *mobilization model* and *deterioration model*. Statistically, the mediating effect can be demonstrated

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only when both direct effects from stressors to resources and from resources to distress are of significant magnitudes (Ensel and Lin 1991, Elliott et, al 1995).

The mobilization model hypothesizes that stressors have a direct and positive impact on resources. The stressful experiences arouse, mobilize, or elevate resources to a higher level. This mobilization further functions to reduce the positive impact of stressors on distress.

The deterioration model hypothesizes that stressors have a direct and negative impact on resources, and a positive effect on distress. Resources reduced or weakened by stressors and result in higher level of distress and eventually weaken the direct positive impact of stressors on distress.

Although it has not been tested by empirical research, it is possible that the presence of stressors may weaken some resources of some age group, and mobilize other resources of other age groups. If either the deterioration hypothesis or the mobilization hypothesis is true, we will see that the TGP migration affect protecting resources of those who face it. The indirect link between the TGP migration and depression through resources will not be the same for different age groups

Interaction/Buffering Effect Hypothesis. The interaction/Buffering effect hypothesis states that stressors will have an impact on distress only under certain conditions, i.e., the lack of resources, or the lack of coping strategies. Testing the buffering hypothesis calls for a demonstration that stress is significantly affected not only by the main effects of the stressor and resources, but also by their "interactions". In addition, the interaction

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effects must show that among those who are exposed to the stressor, those with more resources suffer milder stress than their less resourceful counterparts.

Testing the role of stress mediators in the stress process can provide us with potential explanations for the age differentials in the migration-induced distress. Because mediators can intervene in the relationship between stressors and distress in several ways, they may work differently for different age groups and result in different stress outcomes.

Social Stratification Factors in China

Sociologists are especially interested in how the structured arrangements of people's lives affect their well-being (Pearlin 1989). Age as an important social status is of the most interest of this study. Besides age, other social statuses such as gender, educational attainment, and marital status have repeatedly been found to affect the exposure to and the meaning of stressors, access to stress mediators, and the psychological manifestations of stress. Although these statuses are not in the central place in this study, they should be taken into consideration when we examine the effect of migration and the roles of mediators.

In addition to the above mentioned factors, there is a unique social stratification factor (i.e. urban/rural residence) in China that has to be taken into consideration. In China, the urban/rural difference has been the most important social distinction for half a century (Potter and Potter 1990). Residential registration is an ascribed status determining life chances of every Chinese person (Solinger 1999). This distinction has translated into differential treatment of the Three Gorges relocates. The different treatments can affect rural/urban migrants differently.

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Urban migrants in the same city usually move as a whole. A new city built in another place is often better than the old one (Qi, 2002; Zhou 1998). However, many rural villages have to be broken up into smaller units and sent to different destinations because of the shortage of farmland (Yang 1997; YVWRPB 1999; Zhu 1996, 1999). The process of migration will hurt rural migrants more than urban migrants in terms of its impact on the migrants' social networks.

While urban relocatees are routinely guaranteed new housing at resettlement communities where modern infrastructures such as running water, electricity, and paved roads are assured by the government, rural relocatees are typically deprived of such treatment (Shi 1999). Moreover, the government compensation is mostly based on the value of the house before migration. Because the higher market price of an urban house, urban migrants usually get better compensation than their rural counterparts (Wei 1999).

Rural and urban migrants are also dissimilarly impacted due to the nature of their occupations. While 40% of the affected farmers would be expelled from farm occupations due to ecological limitations (YVWRPB 1999), urban relocatees would not be affected as much because the relocation of plants and offices, upon which an urban livelihood largely depends, is much less ecologically constrained than reclamation of farmland (Li 1998).

For an aged migrant who is also a rural resident, the combination of the two statuses can reinforce the effect of each other. Because older people are more dependent on their social networks from which they can draw support (Pearlin and Skaff 1996), the impending migration may affect rural elderly migrants more adversely than their urban counterparts. Also, because elderly normally experience increasing stress in coping with

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the changes of environment (House and Robbins 1983), the convenience in urban living will make the task for urban old migrants easier than for rural old migrants. Moreover, because it is harder to change occupation and to learn a new skill in later life, middle aged and old rural migrants are expected to encounter more frustration than their urban counterparts.

Summary of Theories and Hypothesis

Although we expect that the impending involuntary migration is a consequential stressor (Hwang et al. 2005) to migrants of all age groups, migrants of different ages may experience it differently and imbue it with different meanings. Four theoretical perspectives which predict that the same stressor may result in rather different reactions by people of different ages are reviewed: life cycle theory, maturity theory, cohort effect theory, and stress process theory. The life cycle theory informs us that people at different life cycle stages have different needs. Therefore, what is considered a cost for migrants of one age group may be a benefit for others. The TGP migration may provide an opportunity to meet the needs of the young migrants but may frustrate those of older ones. Therefore the TGP migration may be perceived as more stressful by the older than by the younger migrants. On the contrary, maturity theories suggest that as people get old, they are more experienced and composed and therefore should be able to better cope with the impending migration. Moreover cohort perspective suggests that older migrants have survived similar situations in the past, the TGP migration will therefore be perceived as less stressful to older than to younger people who tend to be more inexperienced and emotionally unstable.

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Although predicting different directions of the age differentials, the three theories all assume that the TGP migration is more stressful to certain age groups because it has different meaning to people at different ages. Life cycle theory suggests that different needs associated with different human life cycles determine the level of stress of the TGP migration. Maturity theory argues that some personal traits that accompany human aging determine the different levels of stressfulness of the TGP migration. Cohort effect theory indicates that the special historical experience shared by an age group will make the meaning of the TGP migration different to them from that to others. All three perspectives believe that age differentials in the migration effects are the result of age differentials in the perceptions of the TGP migration.

Contrary to these theories, the stress process model reminds us that when facing the same stressor such as the TGP-induced involuntary migration, migrants of different ages will display different stress levels because they possess different resources and resort to different strategies in coping with such stress arousing experience. After adjusting for mediating variables, differences in levels of stress across age groups will shrink or even disappear.

Moreover, resources and coping can work against depression in several different ways. Not only can they inhibit distress independent of the presence of stressors, they can also work as mediators between stress and stressors, or make a conditional relationship between stress and stressors. Age differentials across age groups in both the level and role that resources and coping play in the stress process contribute to the various mental health effects of migration.

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CHAPTER 3

DATA, MEASURES, AND METHODS

Data

A pre-migration survey of a sample of households (n=1,530) in Chongqing municipality's[2] Wanxian Relocation and Development Region (WRDR) was conducted in late 2002 and early 2003. The survey is part of an NIH funded study on the differential impact of the Three Gorges Project on Chinese who reside in areas that would be affected by the dam project.

This survey provides the data used in the analysis. The sample consists of 975 designated migrants and 555 non-migrants recruited from five communities (clusters) randomly selected from WRDR. Although our theoretical population includes all those required to move, the WRDR provides an appropriate survey population because close to 80% of all designated migrants resided in this region (Weng 1999). While we planned to select a representative sample using stratified multistage probability sampling technique with probability proportional to size of clusters, we were forced to modify our plan because the ongoing out-migration from the region has made it impossible for us to estimate cluster sizes reliably. However, the initial plan to stratify the study population by two key independent variables (i.e., migrant status, and rural/urban residence) remains intact, enabling us to make comparisons of groups divided along these important lines. To assure that the study and comparison groups have similar characteristics that may affect the out-

[2] Chongqing municipality used to be a part of Sichuan Province which was separated from the province and became a provincial-level municipality in 1997.

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comes of interest, the non-migrants were selected from the same region. The migrant or non-migrant status is determined solely by the altitude of their house and farmland. Face-to-face interviews were conducted in late 2002 and early 2003 by 29 sociology graduate students from two universities. The survey had a response rate of 99%, a high rate which is typical of face-to-face interviews in China.[3]

A comparison of the demographic profile of our sampled households with the 2000 census results for the entire WRDR (Chongqing Statistical Yearbook 2003) indicated that our sample closely mirrored the population in terms of age, sex, educational compositions, and average family size (see Appendix A).

To compare the migration-depression association among different age groups, the sample was broken down into three age-groups: the young adults (18 to 29 years old); the middle-aged adults (30 to 49 years old); and the old adults (50 or above). Each sub-sample included both migrants and non-migrants. The rationale for the choice of breaking points was as follows: first, in Chinese culture, 30 and 50 are considered important turning points in the life cycle. There is a famous Confucian saying that "by the age of thirty, one should have built up career and family; by the age of fifty, one should have been aware of his destination planned by heaven." Secondly, according to Chinese Population Information Center, in 1997 the average age of marriage is 23.6 years, and the average age for the birth of the first child is 24.48 years in China. Thus, by their later twenties, most Chinese young adults are married and have pre-school age children. After age 30, most adults have children who begin to reach school age, and, as a result, the family needs change greatly (Abu-Lughod and Foley 1960). In China, 50 is the beginning of of-

[3] Examples of high response rate in China can be found in Wang (1996) and Wang, Bai, and Jia (1998), and in many survey-based studies published in China's most prestigious sociological journal—*Sociological Research*.

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ficial retirement age (Department of Labor and Social Security of China 1999). Official retirement ages in China differ by gender, occupation, and the characteristic of work unit, and fifty is the earliest one that is for female in manufacturing occupations (Department of Labor and Social Security of China 1999). Actually, the current average retirement age is 51.2 years old (Yang 2004). These breaking points are broadly accepted by other researchers who study Chinese society (Li 1996).

Measures

Dependent Variable

The outcome variable of interest was *depression.* Depression was measured by the 20-item CES-D scale which was designed to measure an individual's current level of depressive symptomatology, with an emphasis on depressed mood. Respondents were asked "How often 1) were you bothered by things that usually don't bother you? 2) How often have you felt like everything you did was an effort? 3) How often have you felt that you were just as good as other people*[4]? 4) How often have you had trouble keeping your mind on what you were doing? 5) How often have you felt sad? 6) How often have you felt afraid? 7) How often have you felt lonely? 8) How often have you had crying spells? 9) How often have you felt like no talking? 10) How often have you had trouble sleeping? 11) How often did you feel like you were enjoying life*? 12) How often have you felt like you could not shake the blues even with the help of family and friends? 13) How often have you thought that your life has been a failure? 14) How often have you been happy*? 15) How often could you not get going? 16) How often in the last week have you felt hopeful about the future*? 17) How often have you felt that people were

[4] *Asterisked items are reverse-coded.

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unfriendly? 18) How often have you felt like not eating? 19) How often have you felt depressed? 20) How often have you felt that people disliked you?" Responses were coded 0 for less than once a week, 1 for one to two days a week, 2 for three to four days a week, 3 for five to seven days a week. All items were within a range of 0-3, producing a logical range of 0-60 for the summed index, with high score indicated high level of depression.

This instrument has known psychometric attributes and well-established reliability and validity (e.g., Kuo and Tsai 1986; Pearlin 1989; Ross and Van Willigen 1997). In four separate field tests of the scale's reliability, Cronbach's alpha ranged from .84 to .90 (Radloff 1977). Most research using this scale reported high reliability (e.g. Ensel and Lin 1991; Radloff 1977; Turner and Noh 1988). Although this scale has been applied to various ethnic samples, including Chinese Americans (Kuo and Tsai 1986), there have been debates about the manifestation of depression symptoms among the Chinese (Lai 1995). Some argued that the Chinese were not capable of or accustomed to describing problems in psychological terms because the Chinese medical thoughts tend to link psychological symptoms to physical elements (Lin 1981) and the cultural norms tend to emphasize self control of emotions (Wu and Tseng 1985). However, community surveys in Hong Kong and urban China have found support for that Chinese are able to express their psychological states as measured by Western instruments, such a CES-D (Lai 1995; Lee 1981, 1985; Lin 1989).

Other concerns about using CESD to measure depression symptoms among Asian population include interpretations of Asians' responses to the positive affect items (i.e. item 3, 11, 14, and 16) because of the cultural tendency of reporting unusually low levels of positive affect (Cheung 1985; Noh and Avison 1996). Revised versions of this scale

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have been applied to general populations in Urban China (Lai 1995; Lin 1989). To ensure that a scale designed for U.S. population is applicable to respondents in China, we conducted item analyses for the 20 items (Frankfort-Machmias and Nachmias 2000). Our results indicated that the discriminative power of each of these 20 items, including the four positive affect items that have been identified as biased, was statistically significant at the .05 level in the predicted direction. We also recomputed the Cronbach's α using all 20 items based on our sample. The scale had an Alpha value of 0.87.

With respect to validity, the scale has been found to distinguish well between psychiatric inpatient and general population samples, and moderately well among levels of severity within patient groups in Western countries (Husaini et al., 1980; Radloff 1977; Roberts and Vernon 1983).

The CES-D scale also shows good construct validity, correlating well with many life stressors, resources and copings (e.g., Ensel and Lin 1991; Radloff 1977; Turner and Noh 1988). It correlates well with other self-report measures of depression (Radloff 1977). Because the CES-D also has been shown to correlate with scores on other symptom dimensions, a clear claim for discriminant validity cannot be made (Turner and Noh 1988). In this view, some researchers suggest that it is more reasonable to regard elevated scores on the CES-D as reflecting the types of distress that may accompany clinical depression (Devins and Orme 1985).

The CES-D also has been used to estimate the presence of clinically significant depression (Ourers et al. 1979; Radloff 1977; Turner and Noh 1988). Radloff (1977) suggests that scores of 16 or higher reflect the severity of depressive symptoms that have been found to characterize the levels observed in cases of depressive disorder. This cutoff

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point, however, is intended as a means for identifying high-risk groups rather than for the clinical evaluation of individual cases in quite a few social science research. In this dissertation study, we use this cutoff point to measure the presence of high-risk of clinically significant depression. The remaining analysis, however, employ CES-D scores as a continuous variable.

Key Independent Variables

Migration Status. The impending involuntary migration is the main stressor in this study. It was measured by a dichotomous variable with would-be migrant coded 1, and non-migrant coded 0. Because the TGP migration is planned by government, by the time we conducted the survey, every TGP residents was clear about whether or not he or she was required to move.

Age. Age is another variable of our primary interest. Age was measured in number of years. It was categorized into 3 groups defined in previous section to detect cross-group variation in the effect of the TGP-migration. Age was also be used as a continuous variable to detect any within group variation.

Socio-demographic Controls

Stress has been found to be socially patterned (Mirowsky and Ross 1986; Pearlin 1989; Thoits 1995; Turner et al. 1995; Turner and Llyod 1999). This fact has compelled sociologists to search for sociological explanations. Thus, sociological studies of stress have emphasized that individuals of different statuses and roles are exposed to and per-

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ceive stressors differently. Furthermore, persons with dissimilar statuses and roles often possess unequal amounts of coping resources and resort to different coping strategies when facing stressors. Therefore, the objective presence of a common stressor may result in stress for some but not for others. Even when different individuals perceive and cope with stressors similarly, they may express stress differently due to differential socialization.

Several socio-demographic variables are known to be associated with depression. They include gender, education, marital status, and health status. The distributions of these variables among migrants may be different from that of non-migrants. Thus we adjusted for the following socio-demographic variables: *Gender* was coded 1 for females and 0 for males. *Marital status* was coded 1 for currently married, 0 for the others. *Education* was measured in years of schooling. *Health status* was measured by a physical function index. High scores indicate good health. Respondents were asked "How much difficulty do you have in (1) walking ? (2) lifting or carrying objects about 10 pounds? (3) kneeling or stooping? (4) shopping alone? (5) cooking? (6) doing housework alone?" Responses are coded 1 for "can't do", 2 for "with a great deal of difficulty", 3 for "with some difficulty", 4 for "with slight difficulty", 5 for "no difficulty at all".

Given the huge rural/urban divide in China, we also controlled for *household registration status*, which was coded 1 for agricultural households, 0 for non-agricultural households.

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Other Stressors

Although peripheral to our hypotheses, we also adjusted for chronic strains that might affect our dependent variable. As a measurement of *chronic strains* (Pearlin and Schooler 1978), we used an inventory to identify if the respondent was experiencing any prolonged marital, medical, job-related, and other interpersonal problems. Specifically, our chronic strains measure probed the respondents to indicate whether (scored 1) or not (scored 0) they were experiencing any of the following 10 problems of chronic nature: marital dissatisfaction, divorce, widowhood, chronic disease, disability, unemployment, financial debt, troubles with neighbors, co-workers, and local cadres. While it is conventional for researchers of stress to also control for other stressful life events in the form of an inventory count (Holmes and Rahe 1967), we chose not to include them in our analysis because many of these events in the inventory overlapped with our chronic strains measure. Furthermore, we concurred with Pearlin's (1989) position that while life events occur more or less in random manner, chronic strains are imbedded in social structure and therefore they are more sociologically meaningful.

Stress Process Variables

To test the stress process explanation and examine the roles of stress mediators in the stress process (Ensel and Lin 1991; Turner and Lloyd 1999; Wheaton 1985), we included four measures of resources and two measures of coping strategies.

Social Support. Because literature suggests its primary significance for health outcomes, the focus of our interest was perceived social support (Berkman 1984; Cohen

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and Wills 1985; House et al. 1988; Thoits 1995). We used Lin et al.'s (1999) perceived routine support scale, which measures only instrumental and emotional support. Respondents were asked, "Whether or not you could get help or assistance in the following areas on a regular basis if you needed it: 1) someone to lend you money to pay bills or help you get along? 2) Someone to help in doing things around the house? 3) Someone to give you a ride to someplace you had to go? 4) Someone to help with your daily routine if you were not feeling well? 5) Someone to watch your house while you were away? 6) Someone to talk to about something that was bothering you? 7) Company when you felt lonely or just wanted to talk? 8) Someone to talk to about a small argument you had with your husband/wife or closest friend? 9) Someone to make you feel good, loved, or cared for? 10) Someone to talk to about a series of disappointments or bad days?

Responses were coded 1 for "No", 2 for "Don't know", 3 for "Yes, with difficulty", and 4 for "Yes". Responses were summed to produces an index of perceived routine support scored 10-40, with high score indicating high perceived routine support. The Alpha reliability was 0.83.

Although psychological concepts are culturally loaded, we believe that there are human psychological constructs in Chinese culture similar to those in Western culture. We included two measures of psychological resources, mastery and self-esteem.

Mastery. Mastery was measured by the mastery scale used by Pearlin and Schooler (1978). Factor analysis of the seven-item scale by these authors has demonstrated its scalability and reliability. Specifically, mastery is measured by the degree of agreement with the following statements: 1) I have little control over the things that hap-

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pen to me*. 2) There is really no way that I can solve some of the problems I have*. 3) There is little I can do to change many of the important things in my life*. 4) I often feel helpless in dealing with the problems of my life*. 5) Sometimes I feel I am being pushed around in life*. 6) What happens to me in the future mostly depends on myself. 7) I can do just about anything I set my mind to do. Responses were coded 1 for strongly disagree, 2 for disagree, 3 for are neutral, 4 for agree, 5 for strongly agree. All items were rescaled to a range of 1-5, producing a logical range of 7-35 for the summed index. High score indicated high level of mastery. Alpha reliability of this scale in our sample was 0.74.

Self-esteem. Self-esteem was measured using the well-known scale developed by Rosenberg (1965). Respondents were asked "How strongly do you agree or disagree with these statements?" 1) I feel that I'm a person of worth, at least on an equal with others. 2) I feel that I have a number of good qualities. 3) I am able to do things as well as most other people. 4) I take a positive attitude toward myself. 5) On the whole, I am satisfied with myself. 6) I feel I do not have much to be proud of*. 7) I certainly feel useless at times*. 8) At times I think I am no good at all*. 9) All in all, I am inclined to feel that I'm a failure*. Responses were coded 1 for strongly disagree, 2 for disagree, 3 for are neutral, 4 for agree, 5 for strongly agree. All items were rescaled to a range of 1-5, producing a logical range of 9-45 for the summed index. High score indicated high self-esteem. The self-esteem scale used here was slightly different from the original one with one item, "I wish I could have more respect for myself," deleted from our measure. The reason lied in the fact that it failed to significantly discriminate respondents with high (top quarter) and

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low (bottom quarter) overall score of self-esteem. The Cronbach's Alphas for the revised scale and the original scale were 0.77 and 0.72, respectively, based on our sample.

Political Resources. In addition to the aforementioned measures of resources that are commonly used in American context, we included one measures of resources that are unique in China: political resources, which was measured by the number of family members or close relatives of the respondent who were members of China's ruling party or governmental cadre. We expected that respondents who were either themselves members of the party or cadre or were connected to people in such powerful positions would be better protected from the harmful effects associated with the forced migration (Bian and Logan 1996; Rona-Tas 1994; Walder 1995).

Following Pearlin and Schooler (1978), we argued that the Three Gorges migrants could cope with the stressful experience of forced relocation by an assortment of their own actions: 1) by changing the situation from which stressors arise, such as collective bargaining for more favorable compensation; 2) by altering the meaning of the situation to reduce its threat, such as viewing the resettlement as a patriotic sacrifice as propagandized by the government; or 3) by accommodating to the existing stress through passive submission. However, our measurements of coping only tap on the second dimension. We did not include the "changing situations from which stressors arise" and the "passive submission" in our measurement for the following considerations. First, because the prevailing mode of decision-making in China is still non-democratic, the decisions regarding whether or not to build the dam, how and where to relocate the affected families, and the forms and amount of compensation the affected families will receive are made with little

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say from those who are affected. We believe that there is little room for designated migrants in the TGP to change or redefine the situation in their favor and thus reduce their stress level. Secondly, the concept of "passive submission" overlaps with another concept – mastery – already included in our analysis. It is hard to imagine someone with a high degree of mastery will cope with the stress by submitting her/himself passively. The excluding of this concept as a coping strategy is to avoid redundancy and multicolinearity.

Positive Comparison. The first measure of coping response in our study was positive comparison, i.e. using others who were at similar positions in the life course as significant reference figure (Pearlin and Skaff 1996). This concept is opposite to relative deprivation, a concept used widely in sociological literature (Merton 1968) and by demographers (Stark and Taylor 1989) in migration research. We used a revised version of Pearlin and Schooler's (1978) positive comparison scale. Specifically, the four questions were: Compared to those who you know, would you say that you are (a) much worse, (b) somewhat worse, (c) about the same, (d) somewhat better, or (e) much better in (1) income; (2) occupation; (3) social prestige; and (4) social connections? All items were rescaled to a range of 1 to 5, producing a logical range of -4 to 20 for the summed index. High score indicated high perceived routine support. The scale was quite reliable with a Cronbach Coefficient Alpha of 0.79.

Positive Coping. The stress level of those who would be affected by the TGP is also contingent upon the extent to which the respondent supports the government's endeavor on the TGP, or the extent to which s/he endorses the government's propaganda

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that the project's collective benefits outweigh sacrifices individuals are being called to make. Affirmation of the propaganda can be seen as "responses that function to control the meaning of the problem," (Pearlin and Schooler 1978). We used a three-item scale, *positive coping*, to tap into the respondent's endorsement of the TGP. Respondents were asked, "1) Do you think the project will bring more benefits or more harm to your family? 2) Do you think the project will bring more benefits or more harm to the region? And 3) Do you think the TGP will bring more benefits or more harm to society as a whole?" Responses were coded 1 for "more benefits than harm", 0 for "equal amount of benefits and harm", and -1 for "more harm than benefits". The summated scale had a theoretical range of -3 to +3, with a higher score indicating a greater support for the TGP. The scale had a moderate but acceptable reliability (α=0.62).

Methods

Bivariate correlations were first to be conducted to give descriptive statistics of the sample and all the variables in analysis. To examine gross age variations in depression we would compute 95% confidence interval of crude mean levels of depression for migrants and non-migrants for each of the three age groups.

To test the hypotheses regarding age variations in migration-induced distress in a multivariate setting, we would use separated regression models by each of the three age groups: young adults, middle-aged adults, and old adults, and compare the 3 corresponding regression coefficients for migration effect while controlling for any age interactions with stress mediators and other controlling variables. The reasons for using separate models were as follow:

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First, the division of ages into age groups is consistent with the Life cycle theory. Second, the use of separate models for different age groups allows us to examine interaction effects without having to deal with a large number of interaction terms.

Three ordinary least squares regression models would be examined for each age group. We would begin with a model that contains migrant status as the only independent variable. Stress process variable would be added next. Finally, socio-demographic variables and other stressors would be added. The three models could be summarized in the following form:

$$\text{Depression}_a = \mathbf{B}_{0,a} + \mathbf{B}_{1,a}\,\text{migration} + \mathbf{E}_a$$

$$\text{Depression}_a = \mathbf{B}_{0,a} + \mathbf{B}_{1,a}\,\text{migration} + \sum_{i=2}^{k} \mathbf{B}_{i,a}\mathbf{X}_{i,a} + \mathbf{E}_a$$

$$\text{Depression}_a = \boldsymbol{B}_{0,a} + \mathbf{B}_{1,a}\,\text{migration} + \sum_{i=2}^{k} \mathbf{B}_{i,a}\mathbf{X}_{i,a} + \sum_{j=k+1}^{p} \mathbf{B}_{j,a}\mathbf{X}_{j,a} + \mathbf{E}_a$$

Where subscript "$_a$" represents one of the three age groups: (1) young adults, (2) middle-aged adults, and (3) old adults. $\mathbf{B}_0$ represents intercept. $\mathbf{B}_1$ is the slope of the impending involuntary migration. $\mathbf{X}_i$ is a matrix representing six stress mediators, and $\mathbf{B}_j$ is the matrix of the corresponding effects of these stress mediators. $\mathbf{X}_j$ is a matrix of socio-demographic and other stressor controls, and $\mathbf{B}_j$ is the matrix of the effects of these controls. $\mathbf{E}$ represents the random error term.

These separate equations for different age groups can give us a clear picture as to whether there are any age variations in depression associated with the impending migration. When the effects of migration on depression appear to differ for different age groups, pair-wise t-tests of slopes were to be conducted to determine if the differences were statistically significant (Edwards 1966; Logan and Alba 1993), using the following formula:

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$t=(b_2 - b_1)/\sqrt{(s.e._1^2 + s.e._2^2)}$ where $s.e._1$ and $s.e._2$ are the standard errors of the two regression coefficients.

As a result of dividing the random sample into three age groups, the three age-specific sub-samples were no longer random and therefore maybe subject to the influences of sample selective bias (Berk 1983; Chiswick 1978). Potential selection biases were to be estimated and tested by another set of selectivity corrected models. By treating selective biases as an omitted variable, we would take two steps to re-estimate our group specific regression models. First, we were to use some independent variables (i.e. gender, education, physical status, marital status, social support, mastery, and chronic strains) derived from original group specific models to estimate the omitted variable for each age group. The estimated omitted variable was then to be used as a regressor in group specific models to test its effect on dependent variable.

If after controlling for demographic and stress mediate variables, the effects of the impending involuntary migration were still consistently greater in older age groups, life-cycle stage perspective would be supported. If the effects of the impending involuntary migration were consistently smaller in older age groups, the maturity explanation would be supported. If the differences decreased or disappeared after controlling for stress mediators, the stress mediator reasoning would be supported. Age variations within each group would also be examined by using age as a continuous variable in the full models for each age group.

Because resources can affect depression not only directly by minimizing the risks of depression, they can also affect depression through mediation and interaction mechanisms when a stressor is present (Ensel and Lin 1991; Noh and Avison 1996; Turner and

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Lloyd 1999; Wheaton 1985). We would conduct additional analyses to test these alternative hypotheses. Testing the mediating effect requires us to examine the indirect link between the stressor and depression via mediators. There can be two kinds of indirect links between stressor and distress. The deterioration hypothesis would be supported if the stressor exerts a significant negative effect on each of the 6 mediators, and the latter, in turn, exert a significant negative partial effect on depression. In contrast, the counteraction hypothesis would be supported if the stressor exerts a significant positive effect on each of the 6 mediators, and the latter, in turn, exert a significant negative partial effect on depression.

In addition, the interaction hypothesis suggests that because people who are exposed to the same stressor may possess unequal amount of protective resources, the harmful effects of the stressor would be felt differently by individuals with unequal amount of resources. Thus, we should expect a "conditional" relationship between depression and stressors depending on the amount of resources each individual possesses. Testing interaction effect hypothesis calls for a demonstration that stress is significantly affected not only by the main effects of the stressor and resources, but also by their "interaction". In addition, the interaction effect must show that among those who are exposed to the stressor, those with more resources suffer milder stress than their less resourceful counterparts.

Although these alternative conceptualizations of resources do not contradict one another, testing them requires different analyses. We would conduct the required analysis to test the roles stress process variables play in the potential age differentials in the migration-induced depression.

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All above analyses treat CES-D as continuous measure. Treating CES-D as a dichotomous measure, we would further examine age differentials in the risk for clinically significant depression induced by the designated migration. We would conduct Logistic regression analysis to examine if the same set of predictors could be used to detect those who were at risk for clinically significant depression.

The results of the analysis will be presented and discussed in the next chapter.

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CHAPTER 4

RESULTS

Descriptive Analysis

Before we turn to multivariate analysis for hypotheses testing, it is helpful to examine some selected descriptive statistics and the bivariate associations among our variables. Table 1 presents the means and standard deviations of all the variables used in our analysis as well as a correlation matrix showing all possible bivariate associations. Our focus is on those variables that are particularly useful for characterizing the demographic profile of the sample and the key independent and dependent variables.

Of the 1530 respondents included in the study, designated migrants account for 64% of the sample. Further, the sample is made up of 55% female with an average age of 45. The mean education level is 7.48 years. The apparent overrepresentation of women, older, and less educated respondents probably reflects that the region is one of China's major exporters of migrant workers-- a special population that consists mainly of younger and more educated men than those who are left behind (Hwang, Qiao, and Xi 2004; Roberts 1997; Solinger 1999). Because women, the elderly, and the less educated have been repeatedly found to suffer a higher level of depression, it is thus possible that our sample will have a mean depression score that is higher than usual.

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Table1: Means, Standard Deviations, and Bi-variate Correlations for Dependent and Independent Variables (n=1,530)

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Mean	SD
1 CES-D	0.74 *	0.11 *	-0.31 *	-0.50 *	-0.40 *	-0.06 *	-0.37 *	-0.19 *	0.39 *	0.12 *	0.13 *	-0.12 *	-0.05 *	-0.20 *	-0.27 *	21.28	10.32
2 High Risk for Clinical Depression		0.11 *	-0.18 *	-0.35 *	-0.25 *	-0.03	-0.25 *	-0.12 *	0.27 *	-0.06 *	0.07 *	-0.06 *	-0.07 *	-0.11 *	-0.13 *	0.69	0.46
3 Migration Status (Migrant=1)			-0.09 *	-0.04	-0.03	-0.01	-0.07 *	-0.15 *	0.09 *	-0.04	0.09 *	-0.03	-0.06 *	-0.03	-0.03	0.64	0.48
4 Social Support				0.27 *	0.22 *	0.14 *	0.29 *	0.12 *	-0.18 *	-0.02	-0.14 *	0.08 *	0.01	0.17 *	0.13 *	33.37	7.49
5 Mastery					0.41 *	0.13 *	0.33 *	0.14 *	-0.29 *	-0.05 *	-0.09 *	0.05	0.06 *	0.17 *	0.14 *	22.08	4.83
6 Self-Esteem						0.15 *	0.28 *	0.06 *	-0.13 *	-0.08 *	-0.02	0.00	-0.10 *	0.24 *	0.10 *	35.86	5.04
7 Political Resources							0.15 *	0.08 *	-0.03	-0.04	0.05 *	-0.01	-0.12 *	0.18 *	0.01	0.72	0.45
8 Positive Comparison								0.19 *	-0.37 *	-0.17 *	-0.08 *	0.09 *	0.21 *	0.15 *	0.14 *	10.80	2.83
9 Positive Coping									-0.18 *	-0.06 *	0.03	0.06 *	0.23 *	-0.07 *	0.02	1.98	1.29
10 Chronic Strains										0.08 *	0.26 *	-0.22 *	-0.34 *	-0.13 *	-0.20 *	1.60	1.24
11 Gender (Female=1)											-0.07 *	-0.00	-0.02	0.12 *	0.02	0.55	0.50
12 Age												-0.05 *	-0.16 *	-0.39 *	-0.41 *	45.07	13.77
13 Marital Status (Married=1)													-0.07 *	0.03	0.12 *	0.89	0.32
14 Residence (Urban=1)														0.34 *	-0.07 *	0.49	0.50
15 Education															0.17 *	7.48	3.93
16 Physical Function Status																38.52	4.00

* indicates a coefficient is significant at the .05 level.

Depression

The sample has a mean depression score of 21.8, which is considerably higher than the typical levels observed in the United States for various non-clinical populations (Vega and Rumbaut 1991). The higher depression level associated with our sample, however, is understandable not only because of the above mentioned sample characteristics, but also because the TGP project is socially and economically disruptive. This is true not only for the designated migrants who would be directly affected, but also for non-migrants who live in the affected region as a result of the ripple effects. Moreover, although non-migrants do not have to relocate, their relatives or members of their social networks may have to move away. The instability of the community and the anticipated dramatic change in their living environment can also raise the depression level of the non-migrants. In addition, the economic conditions of the area (i.e., the Wanxian Relocation and Development Region) from which the sample is drawn are so depressing compared to other parts of China. Because of the central government's low investment for decades, the region has lagged much further behind from other regions economically. Therefore, although economies in other parts of China have been thriving, development has bypassed this region, making it one of the top regions in exporting migrant workers (Fan 1997; Roberts 1997; Solinger 1999).

In Western literature, the CES-D also has been used to estimate the presence of clinically significant depression. In this dissertation study, however, we used this cutoff point to identify high-risk groups rather than for the clinical evaluation of individual cases. If the cutoff point is meaningful for our Chinese sample, more than two-thirds of our sample was at risk of clinically significant depression.

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In terms of correlations, the first two rows of the matrix indicate that all independent variables were correlated significantly with depression and with the risk for clinically significant depression. Because the latter is a dichotomous measure of the former, we discuss only depression to avoid redundancy. The positive correlation between migration status and depression suggests that designated migrants as a group had a level of depression that was significantly higher than that of non-migrants. Depression was also positively correlated with age, another key variable in this study. However, respondents with more social, psychological (i.e., mastery and self-esteem), and political resources, and those who adopted a stress-averting coping strategy (i.e., positive comparison and positive coping) tended to show lesser degrees of depression than those with fewer resources and poor coping. Our results also show that the impending forced migration was not the only stressor; respondents who face chronic strains in their life also showed significantly elevated levels of depression. With a few exceptions, there were generally positive but moderate correlations among our various indicators of resources and coping. Finally, there were significant variations in depression by gender, marital status, educational attainment, and physical function status. These findings are quite similar to those found in studies focusing on general populations in the West (Thoits 1995; Turner and Lloyd 1999).

Migration Status

Because of our efforts to control for migration selectivity by sampling designated migrants and non-migrants from the same general area, the non-migrant group was an appropriate reference group to study migration effects. Because migration status was sig-

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nificantly associated with other mediators, it makes sense to argue that these mediators were affected by the TGP migration[5]. There were only a few noticeable associations between migration status and other demographic variables, (i.e., age, and rural/urban residence). The correlation between migration status and rural/urban residence was a result of sampling design. However, designated migrants had a significantly higher mean age than non-migrants. Because age was also positively associated with depression, it is important to check the joint distribution of age and migration status. If there are more old people in migrant group than in the non-migrant group, the observed positive association between migration and depression may be spurious. Unless the effect of age is controlled, the true effect of migration status on depression cannot be revealed.

Age

The mean age of the whole sample is 45 years, as shown in Table 1. Table 2 gives additional information on the distribution of age groups and the joint distribution of age and migration status. We categorized the sample into three age groups, 15.75 % of our respondents are in the young-adult group; the majority of the respondents (51.70 %) are in the middle-aged-adult group; and 32.55 % of the respondents are in the oldest age group. Table 2 also shows that there was a higher percentage of old people among designated migrants than among non-migrants (34.26% vs. 29.55%). A Chi-square test indicated a statistically significant difference in age distribution between designated migrants

[5] Because we have cross-sectional data only for this study, we cannot verify the time sequence of these correlations. However, it is possible to argue that the presence of the stressor mobilizes or deteriorates resources and calls for coping strategies (Ensel and Lin 1992). In addition, as mentioned by Pearlin (1989), events and chronic strains can lead to each other and provide meaning contexts for each other. In this study, it is impossible to argue that chronic strain leads to the TGP involuntary migration, but it makes sense to argue that the TGP involuntary migration cause or deteriorate chronic strains.

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and non-migrants. As a result, the observed higher level of depression for designated migrants than that for their non-migrant counterparts may be an artifact of age differences between the two groups in our sample. Given the confounding effect age has on the relationship between migration status and depression, it is necessary to control for age in the regression models.

Table 2: Age Composition by Migration Status

		Migrants		Non-Migrants		Total	
		Count	Percent	Count	Percent	Count	Percent
Age	18 -30	138	14.15	103	18.56	241	15.75
	31-50	503	51.59	288	51.89	791	51.70
	51-89	334	34.26	164	29.55	498	32.55
Total		975	100	555	100	1530	100

As indicated in Table 1, age was significantly associated with most of the variables used in this study. Age was negatively associated with gender, marital status, and with educational attainment. Table 1 also shows a strong negative association between age and physical function status. Because being married, more educated, and having better physical function have been well documented to be associated with better mental health, these factors should be put under control when we study age differentials in the mental health effect of the TGP migration.

Table 1 indicates that age was not only positively associated with depression, it was also negatively related to social and psychological resources and positively associated with political resources. Age was negatively associated with positive comparison, but positively associated with chronic strains. We did not find a significant relationship between age and self-esteem and positive coping. In other words, compared to their

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younger counterparts, older people had a higher level of depression, but possessed lower level of social and psychological resources; they were exposed to more chronic strains; and they were less likely to use positive comparison to cope with the stressful situations. To examine if there were significant age differences in these stress mediators, we present the mean and the 95% confidence intervals for each mediator by age groups in figures 1 through 6.

Figure 1 shows that the young-adult group had the highest mean level of perceived routine support among the three age groups, while the old-adult group had the lowest. The difference between the old adults and the other two age groups was statistically significant. Although the mean level of social support for the middle-aged adults was higher than that of the old adults, the difference between the two means was not significant at the 95 percent confidence level.

The same age pattern was shown in Figure 2. The old adults and the young adults had statistically different levels of mastery, with the level being lower for the older group. The middle-aged adults were not found to be significantly different from the other two age groups. The three age groups, however, did not show significant difference in the self-esteem measure, as shown in Figure 3.

Although the Pearson's correlation between age (when measured at interval-level) and political resources was positive and significant, as shown in Table 1, the differences among the means for the three age groups were not statistically significant when age was trichotomized (see Figure 4). Figure 5 indicates that the young adults were more likely than the middle-aged adults to resort to positive comparison as a coping strategy, while

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Figure 1: 95% CI for Mean Social Support by Age Groups

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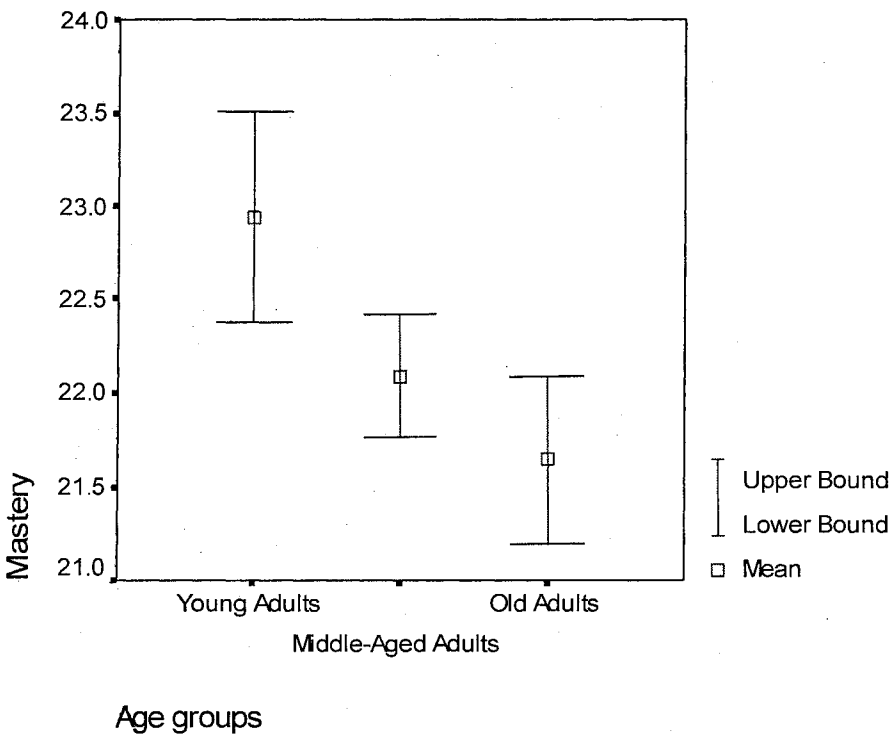

Figure 2: 95% CI for Mean Mastery by Age Groups

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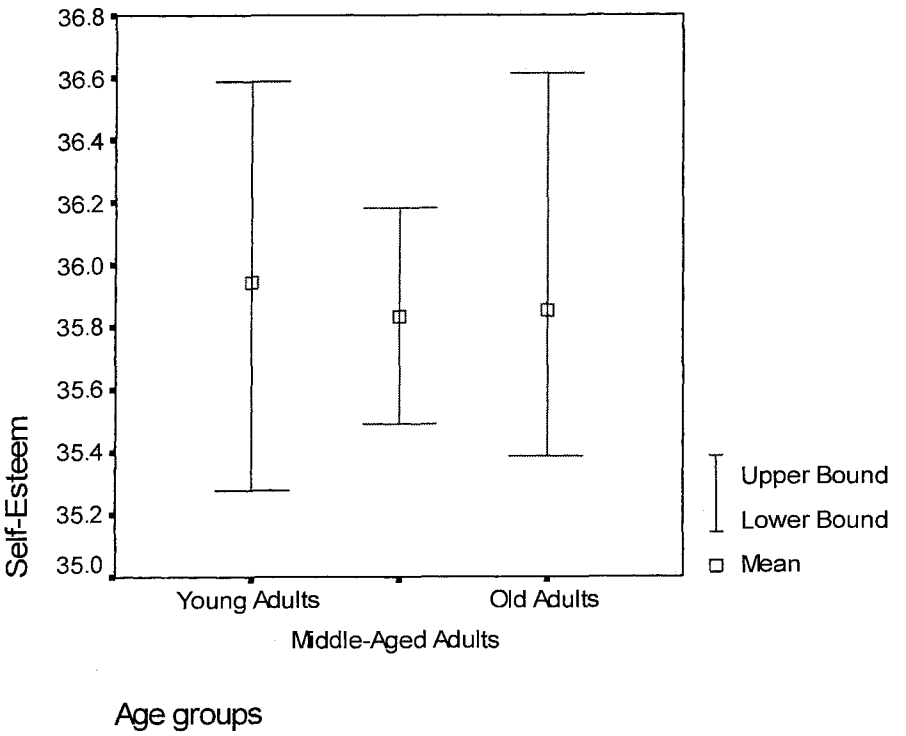

Figure 3: 95% CI for Mean Self-Esteem by Age Groups

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Figure 4: 95% CI for Mean Political Resource by Age Groups

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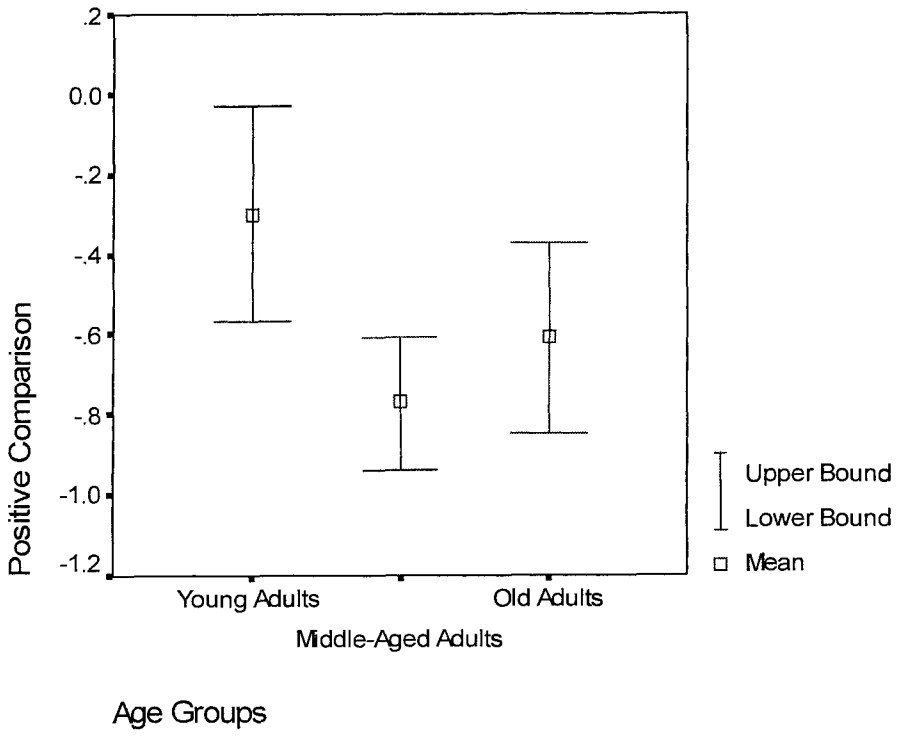

Figure 5: 95% CI for Mean Positive Comparison by Age Groups

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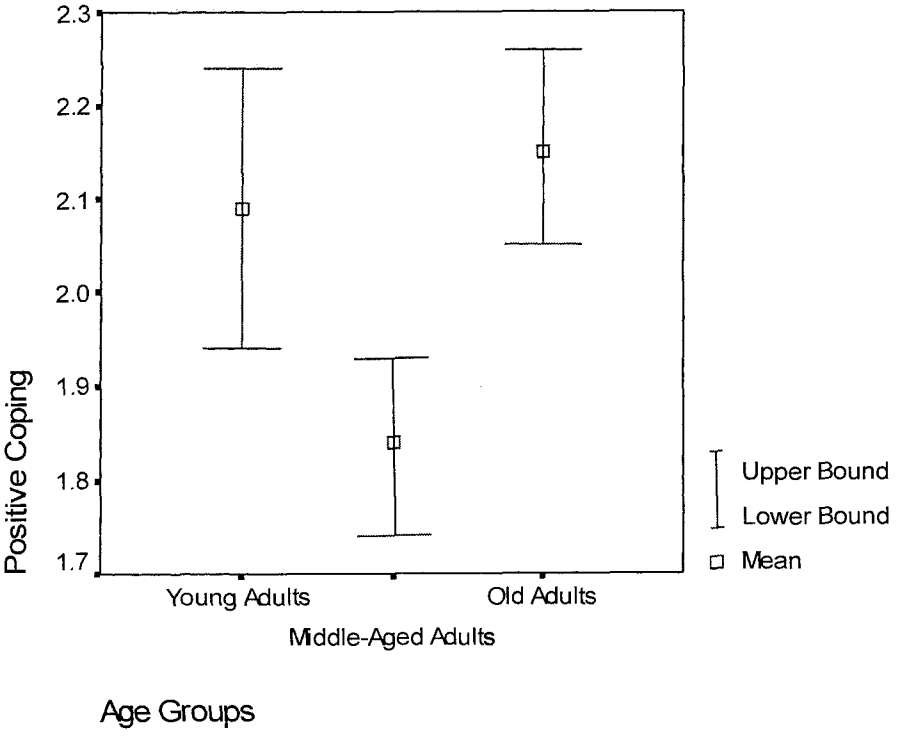

Figure 6: 95% CI for Mean Positive Coping by Age Groups

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the old-adult group was not significantly different from the other two groups in this aspect.

The middle-aged adults were also found to have the lowest level of positive coping, or the tendency to concur with government propaganda with regard to the TGP's benefits. The difference between this age group and the other two was statistically significant. It is not surprising to find that the old adults had the highest mean level of concurring with government's propaganda, because they were brought up in a special historical period during which collective interests justified personal sacrifices. It is surprising, however, that the young adults also showed higher levels of positive coping than the middle-aged adults. Because these young Chinese were brought up in post-Mao China, it was uncustomary for them to follow governmental order unquestioningly. They also had the highest level of educational attainment which tends to be negatively associated with a conformist response toward governmental propaganda (see Table 1). Although cohort perspective could not explain this finding, life cycle theory could. As stated in the previous chapter, the TGP has the potential to meet the most important needs for the young adults, i.e. career opportunities, for both designated migrants and non-migrants, and thus they might welcome it more than people of older ages do. Their positive attitudes toward the TGP might have nothing to do with the governmental propaganda.

Summary of Descriptive Analyses

As a first step toward testing the main hypotheses of this study, descriptive analyses showed that migration status and age were both positively associated with depression. In addition, all variables under study were significantly associated with depression in the

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expected direction. Most of them were also significantly patterned by age. Generally speaking, older people showed higher level of depression, they also possessed lower level of social and psychological resources. Compared to persons of other ages, older people were less likely to use positive comparison to cope with the stressful situations, but were exposed to more stressors besides the TGP migration. They were less educated, more likely to be widowed, and were generally in worse physical functional status. All these factors could put the old adults in a disadvantaged situation in terms of mental health when facing the TGP involuntary migration. The descriptive analyses also suggested the necessity to include all these variables in our hypotheses testing.

However, these results cannot answer the question as to whether or not there are age differentials in migration-induced distress. We still do not know if the old adults are more adversely affected by the TGP involuntary migration than the younger age groups. Nor can these bivariate relationships provide us reliable information about the role of stress mediators in protecting people from the effect of the TGP migration and in shaping the mental health of people of different ages. Multivariate analyses are needed to answer our main research questions.

Multivariate Analysis

To answer the research question as to whether migration affects people of different ages differently, it is necessary to include age and migration status simultaneously in models used to predict depression and to examine whether migration status has different mental health effects across age groups. To unveil the effect of migration on depression across age groups, we first examined crude mean levels of depression for designated mi-

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grants and non-migrants for the three age groups respectively. Figure 7 compares the 95% confidence intervals of depression for six groups formed by cross-tabulating migration status and three age groups.

Figure 7 shows that the only significant difference in depression between migrants and non-migrants was observed in the old-adult group. There was a big gap between the mean depression level for designated migrants and non-migrants among the old adults. Old designated migrants also showed a mean level of depression that was significantly higher than the other five groups. Although the mean level of depression tended to be higher for migrants than that of non-migrants for the two younger age groups, the differences were not statistically significant.

The findings seem to be consistent with the life cycle theory. Older people were more adversely affected by the involuntary migration. Because the observed relationship may actually be caused by other factors that are correlated with both dependent and independent variables, findings displayed in Figure 7 are not conclusive. Nine regression models (three for each age group) were used to examine the partial effects of migration and age. We began with a model that contained migration status as the only independent variable. Then stress mediating variables were added. Finally, socio-demographic variable and other stressors were added into the model. The detailed results of the 9 models are reported in Table 3-5. The age-specific correlation metrics for each age group are presented in appendix.

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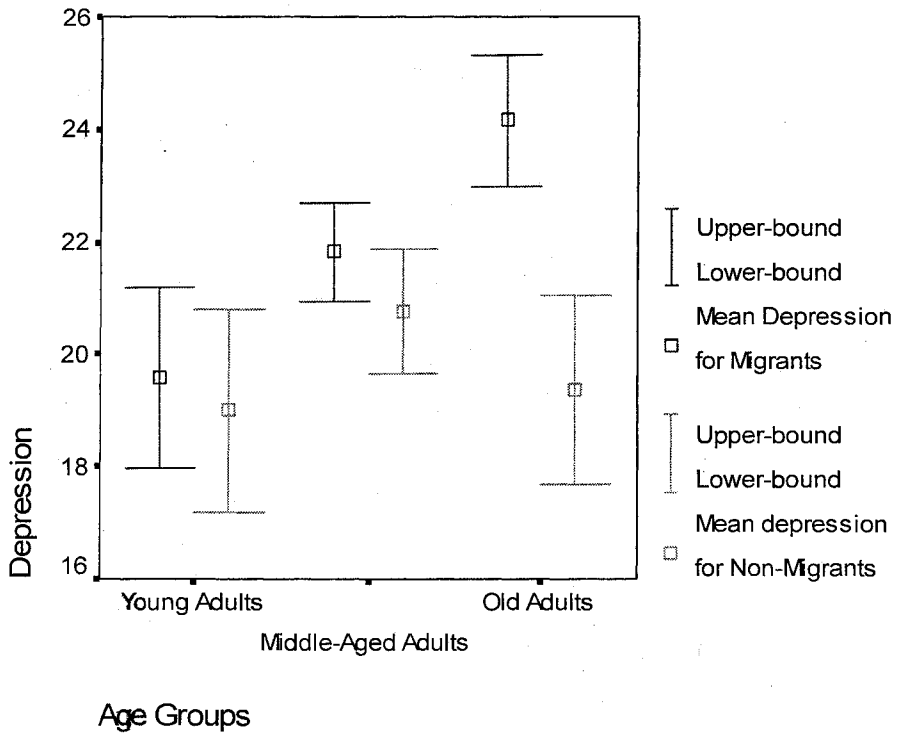

Figure 7: 95% CI for Mean Depression by Age Groups and by Migration Status

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Focusing first on the young adult age group, the slope of migration status was not significant in any of the 3 models with or without control (see Table 3). This indicates that the TGP- induced migration had no significant impact on the mental health of those under 30, regardless of the presence or absence of the stress mediators, other stressors, and social demographic variables.

Table 3 also shows that for the young adults, several stress mediators had a negative and significant association with depression, which means they worked directly against depression independent of the presence or absence of the TGP migration. The coefficients for mastery and self esteem were negative and statistically significant, indicating that these factors worked to reduce depression. As indicated by standardized regression coefficient beta, the two psychological resources were the most important protective factors among the 6 mediators. Such results were consistent with Ensel and Lin's (1991) independent effect hypothesis.

To our surprise, social support was not found to be a significant protective resource for our young respondents. Although the bivariate correlation between social support and depression was negative and significant for the young adults (-.25) (see Appendix B), the partial effect of social support turned not significant after controlling for other variables such as mastery, self-esteem, and positive comparison.

We were also surprised by the finding that the partial effect of political resource became positive for this group after controlling for other variables. This result seems to suggest that the TGP was more stressful to those who had much to loose. Because the political resources in China were highly localized and short-lived (Wei 1999), it means

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Table 3: Regression Analysis of the TGP Involuntary Migration for the Young Adults (n=241)

	Model 1		Model 2		Model 3	
Variables	Coef.	Beta	Coef.	Beta	Coef.	Beta
Migration Status (Migrant=1)	0.59	0.03	-0.15	-0.01	-0.37	-0.02
Social Support			-0.14	-0.10	-0.12	-0.09
Mastery			-0.48 ***	-0.22	-0.39 **	-0.18
Self-Esteem			-0.44 ***	-0.24	-0.42 ***	-0.22
Political Resources			3.50 **	0.17	2.91 *	0.14
Positive Comparison			-0.83 **	-0.18	-0.70 *	-0.16
Positive Coping			-1.07 *	-0.13	-0.81	-0.10
Chronic Strains					2.87 ***	0.26
Age					0.31	0.11
Gender (Female=1)					0.04	0.00
Marital Status (Married=1)					-1.41	-0.06
Residence (Urban=1)					-0.06	0.00
Education					0.09	0.03
Physical Function					-0.37	-0.06
Constant	19.00 ***		49.64 ***		50.47 ***	
R-Sq	0.00		0.28		0.37	

* indicates a coefficient significant at the .05 level.
**indicates a coefficient significant at the .01 level.
***indicates a coefficient significant at the .001 level.

that any political resources these local cadres amassed were likely to be lost as their term expires and when they were relocated to a different community.

As expected, young respondents who made positive comparisons with others and those who endorsed the governmental propaganda about the TGP were less depressed than those who did not. Controlling for demographic variables, however, eliminated the protective effects of positive coping.

As regard to other stressors, more chronic strains were significantly associated with higher level of depression for the young adults. There was no significant age variation in depression within the group. Neither did gender, marital status, rural/urban residence, education, and physical function exert a statistically significant effect on depression.

Similar analyses were conducted for the middle-aged adults in Table 4. Table 4 indicates that TGP-induced migration does not significantly affect the mental health of the middle-aged Chinese. But most of the stress mediators had independent protective effects on depression for the middle-aged adults. Among the 6 stress mediators, 4 significantly worked against depression. Specifically, those middle-aged respondents who had psychological resources (i.e., mastery and self-esteem), and those who adopted a stress-averting coping strategy (i.e., positive comparison and positive coping) tended to show lesser degrees of depression than those with fewer resources and poor coping. Social support was still not a significant protective resource for the middle-aged respondents. Although the bivariate association between social support and depression for the middle-aged adults was negative and significant (see Appendix C), this gross effect vanished once other variables were included in the model. Most likely, the including of mastery,

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self-esteem, and positive comparison washed away the effect of social support, because they were positively associated with social support but had much stronger association with depression for the middle-aged adults group. As indicated by standardized regression coefficient beta, psychological resources employed the most important protective role among the 6 stress mediators.

The exposure to more chronic life strains was significantly associated with higher level of depression for the middle-aged adults. Unlike the results for the youngest age group, higher education and better physical function were found to reduce the depression level for the middle-aged adults. Finally, we failed to find any age variation in depression level within the group.

The results of a corresponding analysis for the oldest age group are presented in Table 5. The results indicates that the TGP-induced migration negatively affected the depression level of those older than 50. Without controlling, the mean depression score of old designated migrants was 4.79 points higher than their non-migrants counterparts. The migration effect for the old adults was about twice the magnitude of that found for the entire sample in preliminary analysis. Controlling for the stress mediators reduced the gap by half but failed to eliminate it. This suggests that the difference in depression level between the designated migrants and non-migrants and among the old adults was partly caused by the different level of stress mediators they possess. In other words, there was an indirect link between the stressor and depression via mediators. We will discuss this point in detail in later section. The difference in depression between migrants and non-migrants remained statistically significant even after controlling for five additional demographic factors which had shown to correlate significantly with depression in the

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Table 4: Regression Analysis of the TGP Involuntary Migration for the Middle-Aged Adults (n=791)

	Model 1		Model 2		Model 3	
Variables	Coef.	Beta	Coef.	Beta	Coef.	Beta
Migration Status (Migrant=1)	1.07	0.05	0.46	0.02	0.41	0.02
Social Support			-0.06	-0.05	-0.03	-0.02
Mastery			-0.64 ***	-0.31	-0.58 ***	-0.28
Self-Esteem			-0.45 ***	-0.22	-0.42 ***	-0.21
Political Resources			0.72	0.03	1.07	0.05
Positive Comparison			-0.62 ***	-0.15	-0.36 **	-0.09
Positive Coping			-0.77 ***	-0.10	-0.61 **	-0.08
Chronic Strains					1.84 ***	0.20
Age					-0.03	-0.02
Gender (Female=1)					0.53	0.03
Marital Status (Married=1)					0.62	0.01
Residence (Urban=1)					0.74	0.04
Education					-0.22 *	-0.08
Physical Function					-0.53 ***	-0.13
Constant	20.76 ***		52.95 ***		69.16 ***	
R-Sq	0.00		0.32		0.39	

* indicates a coefficient significant at the .05 level.
**indicates a coefficient significant at the .01 level.
***indicates a coefficient significant at the .001 level.

bivariate analysis. Table 5 tells us that the TGP-induced migration was a significant and robust predictor of depression for those older than 50.

Focusing on the 6 mediators, we found that three of the four resources played significant protective roles. Specifically, both social and psychological resources had significant independent protective effects for the old adults. In other words, those who possess higher level of social support, mastery, and self-esteem were protected from negative mental health outcome. However, political resources did not perform the expected protective role. Moreover, contrary to our expectation, the two coping strategies that helped the young and the middle-aged adults to handle stress did not exert the expected protective effects for the old adults.

Unlike what we found in the two younger age groups, social support played an important role to protect the old adults from depression as indicated by the beta coefficient. Although mastery was the one that played the most important role, social support was the second most important protector. Its effects even overweight the effects of chronic strains and gender, which were positively associated with depression; and the effects of physical function, which was negatively associated with depression.

Further, there was no significant age variation in depression within the group. Neither did marital status, rural/urban residence, or educational attainment exert a statistically significant effect on depression. The lack of within-group age variation for all three age groups empirically supported our choice of cutoff points in categorizing age into the three age groups.

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Table 5: Regression Analysis of the TGP Involuntary Migration for the Old Adults (n=498)

	Model 1		Model 2		Model 3	
Variables	Coef.	Beta	Coef.	Beta	Coef.	Beta
Migration Status (Migrant=1)	4.79 ***	0.20	2.24 **	0.10	1.99 **	0.08
Social Support			-0.29 ***	-0.20	-0.29 ***	-0.20
Mastery			-0.83 ***	-0.38	-0.71 ***	-0.33
Self-Esteem			-0.40 ***	-0.19	-0.33 ***	-0.15
Political Resources			1.88 *	0.07	1.29	0.05
Positive Comparison			-0.59 ***	-0.14	-0.25	-0.06
Positive Coping			-0.55	-0.06	-0.55	-0.06
Chronic Strains					1.69 ***	0.17
Age					-0.01	-0.10
Gender (Female=1)					3.16 ***	0.14
Marital Status (Married=1)					-1.89	-0.06
Residence (Urban=1)					-1.01	-0.05
Education					0.04	0.01
Physical Function					-0.29 ***	-0.15
Constant	19.38 ***		60.93 ***		69.69 ***	
R-Sq	0.04		0.46		0.54	

* indicates a coefficient significant at the .05 level.
**indicates a coefficient significant at the .01 level.
***indicates a coefficient significant at the .001 level.

It seems obvious from these 9 regression models that the TGP migration depressed the old adults much more than it did the other age groups[6]. We used pair-wise t-tests of regression coefficients to test the statistical significance of age differentials in the effect of migration on depression. The results of the pair-wise t-tests are shown in Table 6. Panel A in Table 6 indicates that in the models without any controls, the negative slope associated with migration status for the old adults was significantly greater than that for the young and the middle-aged adults. Controlling for stress mediators, however, reduced the difference in the effects of migration between the old adults and the other two groups (see panel B). This means that parts of the age differentials in the effect of migration on mental health were due to differences in stress mediators among groups. Controlling for additional factors (i.e., stress exposures, social demographic factors, and physical function status), further reduced but failed to eliminate the age differentials in the migration effect (see panel C). This suggested, other things being equal, the TGP migration had a greater adverse effect on the mental health for the old adults than for the young and the middle-aged adults.

Further, although the regression coefficients associated with migration status for the middle-aged adults were always bigger than those for the young adults, no statistically significant difference was found in the corresponding pair-wise t-tests. These results suggested that the TGP migration did not have a more adverse effect on the mental health for the middle-aged adults than for the young adults.

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[6] Because of the division of the sample into three age groups, the three age-specific sub-samples are no longer random. Potential selection biases were estimated and tested by another set of selectivity corrected models (see Appendix E, F, G). No selectivity effect has been found in any of the three age groups.

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Table 6: Pair-wise t-tests of the Migration Effect Across Age Groups

	A: Model 1						
	b_1	se_1	b_2	se_2	b_1-b_2	t[a]	df
Young vs.Middle-Aged Adults	0.59	1.23	1.07	0.74	-0.48	-0.33	1030
Young vs.Old Adults	0.59	1.23	4.79	1.04	-4.20	-2.61 *	737
Middle-Aged vs. Old Adults	1.07	0.74	4.79	1.04	-3.72	-2.91 *	1287
	B: Model 2						
	b_1	se_1	b_2	se_2	b_1-b_2	t[a]	df
Young vs.Middle-Aged Adults	-0.15	1.09	0.46	0.62	-0.61	-0.49	1030
Young vs.Old Adults	-0.15	1.09	2.24	0.80	-2.39	-1.77 *	737
Middle-Aged vs. Old Adults	0.46	0.62	2.24	0.80	-1.78	-1.76 *	1287
	C: Model 3						
	b_1	se_1	b_2	se_2	b_1-b_2	t[a]	df
Young vs.Middle-Aged Adults	-0.37	1.06	0.41	0.59	-0.78	-0.64	1030
Young vs.Old Adults	-0.37	1.06	1.99	0.75	-2.36	-1.82 *	737
Middle-Aged vs. Old Adults	0.41	0.59	1.99	0.75	-1.58	-1.66 *	1287

[a] t value is calculated by the fomular:=(b_1 - b_2)/ sqrt(se_1^2+se_2^2)

* significant at .05 using one-tailed t-test.

Our results did not lend support to maturity theory and cohort perspective, but rather, they provided some support for the prediction of the life cycle theory. In other words, the findings indicate that the impending involuntary migration as a stressor had the greatest adverse mental health impact on the old adults. Because we failed to find a larger migration effect for the middle-aged than for the young adults, we therefore could not conclude that our findings were entirely consistent with the prediction of the life cycle theory. Our findings also supported stress process model because of the detected shrinkages in age differentials after we took into account stress mediators. The TGP migration was more stressful to the old adults because the stress process variables played a role. The observed age differentials in migration-induced depression could be partly explained by the age differentials in the possession of stress mediators.

Roles of Stress Mediators

As discussed in the previous chapter, stress mediators can protect people from stressors through several ways: be protective independent of specific stressors (independent effect hypothesis), buffer the effect of stressors (interaction effect hypothesis), and play a mediating role between stressors and stress outcomes (indirect effect hypothesis).

Although these alternative hypotheses of stress mediators do not contradict one another, testing them requires different analyses. The independent effect hypothesis is supported if resources exert a significant negative effect on stress, with or without the stressor. Confirming mediating hypothesis, on the other hand, requires one to demonstrate not only the existence of a significant association between resources and stress, but also a significant negative link between the stressor and resources. Testing buffering hy-

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pothesis calls for a demonstration that stress is significantly affected by the main effects of the stressor and resources and their "interactions". In addition, the interaction effects must show that among those who are exposed to the stressor, those with more resources suffer milder stress than their less resourceful counterparts.

The full regression models in Table 3-5 tested the independent effect hypothesis. As indicated by the results of these regression analyses, most stress mediators did discourage depression among the TGP residents, independent of the stressor under study. We also conducted pair-wise t-test for each of the six stress mediators similar to Table 6 to see if there were significant age differences (see Appendix H). Significant age differentials were found for social support and mastery. For the young and the middle-aged adults, social support was not a significant protective resource that worked against depression. However, for the old adults, social support was an important resource that could protect them from distress. The difference between the old and the middle-aged adults were statistically significant. Although mastery protected people from depression regardless of their age, it seems that it was more important for the old than for the young adults. Social support and mastery as protective resources were more valuable for the old adults than for younger age groups in terms of psychological well-being.

The preceding analysis represented only one of several possible conceptualizations of stress mediators. In addition to seeing resources and coping strategies as factors which exert a direct and independent effect on stress, they have also been seen as "mediating" factors that intervene between the stressor and mental health outcome (Baron and Kenny 1986; Elliott et al. 2001; Ensel and Lin 1991). There can be two kinds of indirect links between stressor and distress. The deterioration hypothesis maintains that while

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people with more resources have lower risks to mental distress, exposure to stressors can wear out such protective resources, thus, a positive but indirect association between stressor and depression should be expected from the resource deterioration effect. In contrast, the mobilization hypothesis suggests that the exposure to the stressor can call for resources and activate copings to reduce the stress, as a result, a negative and indirect association between stressor and depression via mediators should be expected.

Figure 8 shows the conceptual model corresponds to the resources deterioration/mobilization hypotheses. We hypothesized that the stressor exerted an effect on the stressor mediator (β_a), which was negative for resources deterioration hypothesis and positive for resources mobilization hypothesis. The stress mediator, in turn, exerted a negative effect on depression (β_b). When both β_a and β_b are negative and statistically significant, the indirect effect of the stressor via a stress mediator, or the product of $\beta_a\beta_b$, should be positive, and the resource deterioration hypothesis should be supported. On the contrary, when β_a is positive and β_b is negative and they are both statistically significant, the indirect effect of the stressor via a stress mediator ($\beta_a\beta_b$), should be negative, and the indirect effect counteracts the positive direct effect between stress and depression. Thus, the resources mobilization hypothesis should be supported.

Because no significant bivariate association between migration status and depression was found for the young and the middle-aged adults, there was no need to test the mediation effects of the mediators for these two age groups (Baron and Kenny 1986; Elliott et al. 2001). Table 7 shows the estimated values of β_a and β_b and their corresponding standard errors (σ_a and σ_b) for the old adults group. The β_a and σ_a were estimated by regressing each of the mediators on the stressor using simple regression analyses,

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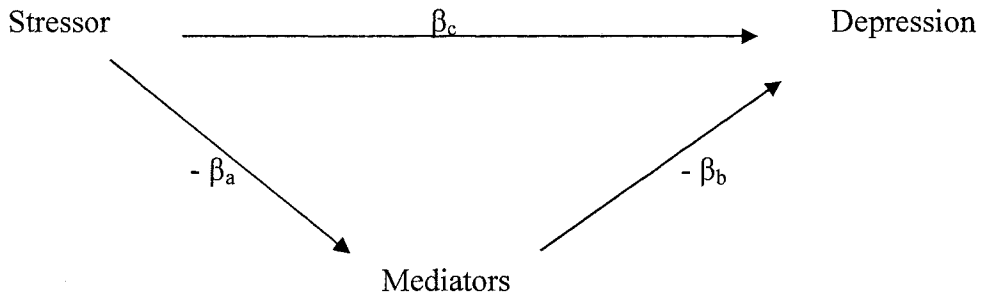

Figure 8: The Conceptual Model Corresponds to Indirect Effect Hypothesis

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Table 7: Indirect Effects of the TGP Involuntary Migration on Depression Via Mediators for the Old Adults (n=498)

Mediator	β_a [1]	σ_a	β_b [2]	σ_b	$\beta_a\beta_b$ [3]	$\sigma_{\beta a \beta b}$ [4]	t
Social Support	-2.60 ***	0.73	-0.29 ***	0.05	0.75	0.25	3.05 ***
Mastery	-1.00 *	0.48	-0.71 ***	0.08	0.71	0.35	2.03 *
Self-Esteem	-1.55 **	0.50	-0.33 ***	0.07	0.51	0.20	2.60 **
Political Resources	-0.04	0.04	1.29	0.86	-0.05	0.06	-0.83
Positive Comparison	-0.40	0.26	-0.25	0.15	0.10	0.09	1.14
Positive Coping	-0.37 *	0.11	-0.55	0.30	0.20	0.13	1.61

* indicates a coefficient is significant at the .05 level.

**indicates a coefficient is significant at the .01 level.

***indicates a coefficient is significant at the .001 level.

[1] β_a indicates the effect of forced migration on mediator

[2] β_b indicates the effect of mediator on depression

[3] $\beta_a\beta_b$ indicates the indirect effect of forced migration on depression via mediator

[4] the standard error of the mediation effect is estimated by the fellowing formula given by Krull and Mackinnon (2001): $\sigma_{\beta_a\beta_b} = \sqrt{\sigma^2_{\beta_a}\beta_b^2 + \sigma^2_{\beta_b}\beta_a^2}$

whereas β_b and σ_b were obtained from model 3 as reported in Table 5. The results clearly show that although three of the six stress mediators (i.e., social support, mastery, and self-esteem) exerted a significant negative effect on depression (see column 3), four of the six stress mediators (i.e., social support, mastery, self-esteem and positive coping) were affected significantly by forced migration in the predicted direction (see column 1). As indicated by the negative sign of the β_a in column 1, the anticipated forced migration did not mobilize resources and copings but rather deteriorate them. Anticipating the forced migration wore out the social support of the old designated migrants, taxed on their sense of mastery and self-esteem and they were more cynical of the officially claimed "benefits" of the TGP for the family, the region, and the country than their non-migrant counterparts.

The last three columns of Table 7 present results of a formal test of the indirect effects hypothesis. The indirect effects of involuntary migration on depression via mediators were estimated by $\beta_a\beta_b$, the product of β_a and β_b. Following Turner and Llyod (1999), we conducted t-test to detect if any of the six indirect effects was statistically significant. The t-tests were conducted by dividing each of the indirect effects, $\beta_a\beta_b$, by its corresponding standard error, $\sigma_{\beta a \beta b}$, estimated by using a formula suggested by Krull and MacKinnon (2001):

$$\sigma_{\beta_a\beta_b} = \sqrt{\sigma^2_{\beta_a}\beta^2_b + \sigma^2_{\beta_b}\beta^2_a}$$

These findings made clear that the deterioration effect hypothesis was partially supported. The anticipation of forced migration exerted a significant indirect effect on depression for the old migrants mainly via the mediation of social and psychological re-

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sources. Compared to non-migrants counterparts, the old designated migrants showed a significantly lower level of perceived routine support from others, a lower sense of mastery over their personal life, and a lower self-esteem. Because social and psychological resources were essential for safeguarding people from distress, a weakening of these protective resources by the government imposed relocation, thus, significantly increased the risk of depression among the old designated migrants.

Because the direct link between migration and depression for the old adults was still significant, as indicated by the significant partial effect of migration in the full model in Table 5, social and psychological resources only mediated parts of the migration effects for the old adults. The indirect link between migration and depression through social and psychological resources indicated that the deteriorated protective resources were partially responsible for the higher level of depression experienced by the old designated migrants.

Because mediators have also been seen as "conditioning" (interaction hypothesis) factors that regulate any effects stressors may have on an individual (Ensel and Lin 1991), we conducted analysis to test the interaction effect that the extent to which the stressor can cause depression depends on the amount of resources an individual possesses and the coping strategy s/he adopted. Although we failed to detect any significant migration effect for the young adults and the middle-aged adults, it is possible that for young adults or middle-aged adults who possess higher level of resources were better protected than those who possess lower level of resources. Therefore, we test interaction effect for all three groups (Baron and Kenny 1986). The interaction effects of the stressor and the six stress mediators were under examination. When a negative interaction effect is found, it is pos-

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sible to suggest that the positive effect of the stressor on the outcome variable would be reduced as the value of the stress mediator rises. Such a finding would indicate that despite the forced relocation would trigger depression, those designated migrants with more resources and those who resort to positive coping can somehow ameliorate this harmful effect.

Because the inclusion of six interaction terms in the model would inevitably generate multicollinearity, one way to reduce the problem is to mean-center component variables before interaction terms are computed and included in the analysis (Tabachnick and Fidell 2001). Table 8-10 presents the results of testing interaction effect using mean-centered measure of stress mediators.

The results of the tests did not lend support to the buffering model. For the young and the old adults, none of the interaction terms was statistically significant. For the middle-aged adults, only positive coping was found to interact with the stressor. However, the interaction effect had the same direction as the mean effect of the stressor, which meant that adverse migration effect was greater among those who tended to cope with the stressor more positively. This is inconsistent with buffering hypothesis.

As indicated by values of variance inflation factors (VIF), the inclusion of interaction terms into the model inflated the standard errors of the interaction terms and their components. All stress mediators have VIF values that were significantly larger than one for three age groups. As a result, not only the interaction terms but also most of the mediators failed to reach the conventional level of statistical significance.

As a summary, the stress process variables had independent effects for all three age groups. In addition, for the old adults, social and psychological resources partially

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Table 8: Interaction Effect of the TGP Involuntary Migration and Stress Mediators for the Young Adults (n=241)

Variable	Regression Coefficients	VIF
Migration Status (Migrant=1)	-0.38	1.28
Social Support	-0.69	2.56
Mastery	-2.24 *	3.23
Self-Esteem	-2.19 *	3.12
Political Resources	1.08	2.65
Positive Comparison	-1.15	2.95
Positive Coping	-1.88	3.50
Chronic Strains	2.91 ***	1.13
Age	0.32	1.42
Gender (Female=1)	0.06	1.13
Marital Status (Married=1)	-1.75	1.59
Residence (Urban=1)	-0.22	1.44
Education	0.10	1.66
Physical Function	-1.49	1.13
Migration Status*Social Support	-0.25	2.80
Migration Status*Self-Mastery	0.55	3.23
Migration Status*Self-Esteem	-0.04	3.00
Migration Status*Political Resources	0.51	2.34
Migration Status*Positive Comparison	-1.07	2.95
Migration Status*Positive Coping	1.29	3.37

* indicates a coefficient is significant at the .05 level.
**indicates a coefficient is significant at the .01 level.
***indicates a coefficient is significant at the .001 level.

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Table 9: Interaction Effect of the TGP Involuntary Migration and Stress Mediators for the Middle-aged Adults (n=791)

Variable	Regression Coefficients	VIF
Migration Status (Migrant=1)	0.39	1.05
Social Support	-0.16	4.01
Mastery	-2.44 ***	3.70
Self-Esteem	2.76 ***	4.29
Political Resources	0.86	3.05
Positive Comparison	-0.37	4.86
Positive Coping	-2.33 ***	4.17
Chronic Strains	1.88 ***	1.27
Age	-0.02	1.15
Gender (Female=1)	0.46 ***	1.04
Marital Status (Married=1)	0.76	1.14
Residence (Urban=1)	0.65	1.55
Education	-0.22 *	1.54
Physical Function	-2.14 ***	1.09
Migration Status*Social Support	-0.02	3.91
Migration Status*Self-Mastery	-0.50	3.71
Migration Status*Self-Esteem	0.91	4.11
Migration Status*Political Resources	-0.66	3.01
Migration Status*Positive Comparison	-0.74	4.86
Migration Status*Positive Coping	2.16 ***	4.08

* indicates a coefficient is significant at the .05 level.
**indicates a coefficient is significant at the .01 level.
***indicates a coefficient is significant at the .001 level.

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Table 10: Interaction Effect of the TGP Involuntary Migration and Stress Mediators for the Old Adults (n=498)

Variable	Regression Coefficients	VIF
Migration Status (Migrant=1)	1.91 *	1.25
Social Support	-2.12 **	4.83
Mastery	-3.94 ***	3.97
Self-Esteem	-1.24	4.40
Political Resources	0.11	3.81
Positive Comparison	0.02	4.70
Positive Coping	-1.03	5.26
Chronic Strains	1.69 ***	1.36
Age	-0.02	1.42
Gender (Female=1)	3.12 ***	1.21
Marital Status (Married=1)	-1.76	1.29
Residence (Urban=1)	-1.01	1.46
Education	0.02	1.54
Physical Function	-1.21 ***	1.39
Migration Status*Social Support	-0.09	4.59
Migration Status*Self-Mastery	0.80	3.96
Migration Status*Self-Esteem	-0.62	4.27
Migration Status*Political Resources	0.67	3.73
Migration Status*Positive Comparison	-0.86	4.38
Migration Status*Positive Coping	0.37	5.00

* indicates a coefficient is significant at the .05 level.
**indicates a coefficient is significant at the .01 level.
***indicates a coefficient is significant at the .001 level.

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mediated the association between migration and depression. Although individuals with fewer resources were more vulnerable to stress, regardless of their age, the involuntary migration was most hurtful for the older designated migrants because it drained their social resources and chipped away at their psychological resources.

Additional Analysis

In depression literature, a CES-D score of 16 has been suggested as a suitable cutoff point for distinguishing roughly those in the community with clinically significant depression, or those who are at risk of such depression (Ourers et al. 1979; Radloff 1977). Table 11 presents the raw percentage of subjects who scored 16 or higher, by migration status and age groups.

Table 11: Raw Percentages of CES-D Scores of 16 or Higher for Migrants and Non-migrants by age.

	Migrants	Non-migrants	t		N
18-29	61.59	61.17	0.07		241
30-49	72.17	64.58	2.23	*	791
50+	78.14	57.32	4.64	***	498
Total	72.72	61.80	4.35	***	1530

* indicates a coefficient is significant at the .05 level.
** indicates a coefficient is significant at the .01 level.
*** indicates a coefficient is significant at the .001 level.

Table 11 indicates that 73 percent of the designated migrants in our sample were at risk of clinically significant depression. If the 16 or above rule is also meaningful in China, about three-fourths of the designated migrants exhibited clinically significant levels of depressive symptomatology. A much lower, but still high, percentage was found

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for the non-migrants sub-sample. About 62 percent of non-migrants were at risk of this depression.

For the below 30 sub-sample, about the same percentage of migrants and non-migrants could be classified as at risk for clinically significant depression. For those between 30 and 50, 72% of designated migrants were at risk. A much lower, although still high, percentage was found among non-migrants. A significant t-test indicated that the risk for clinically significant depression was higher for the designated migrants than non-migrants in this age group.

For those who were 50 or older, 78% of designated migrants and only 57% of non-migrants were at risk, a difference of more than 20 percentage points. The difference between these two percentages was statistically significant.

Although Table 11 demonstrates that the risk for clinical depression was higher for the designated migrants than non-migrants in general, it was not the case for the young adults. However, for the middle-aged adults and especially, the old adults, the risk for clinically significant depression was much higher for the designated migrants than their non-migrant counterparts.

It was important to examine whether these observed differences remain after controlling for factors that might be distributed differently across age groups. Table 12 reports the results from logistic regression analysis of CES-D score treated as a dichotomous outcome for the two age groups for which there was a significant gross difference in clinical depression between migrants and non-migrants.

After controlling for 13 variables, Table 12 demonstrates that, for those between 30 and 50 years old, the migration effect found in bivariate analysis became only

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Table 12: Logistic Regression Analysis of CES-D Scores of 16 or Higher (n=1,530)

	Middle-Aged Adults		Old Adults	
Variables	coef.	Odds Ratio	coef.	Odds Ratio
Migration Status (Migrant=1)	0.31	1.36	0.80 **	2.22
Social Support	-0.01	0.99	-0.03	0.97
Mastery	-0.11 ***	0.9	-0.16 ***	0.86
Self-Esteem	-0.06 **	0.94	-0.09 **	0.91
Political Resources	0.15	1.16	0.55	1.74
Positive Comparison	-0.01	0.99	-0.11	0.9
Positive Coping	-0.10	0.9	-0.10	0.91
Chronic Strains	0.42 ***	1.53	0.52 ***	1.69
Age	-0.01	0.99	-0.02	0.98
Gender (Female=1)	-0.02	0.98	0.71 **	2.03
Marital Status (Married=1)	0.32	1.37	-0.27	0.76
Residence (Urban=1)	0.50 *	1.65	-0.14	0.87
Education	-0.05	0.96	0.03	1.03
Physical Function	-0.07	0.93	-0.07 *	0.93

* indicates a odds ratio significant at the .05 level.
**indicates a odds ratio significant at the .01 level.
***indicates a odds ratio significant at the .001 level.

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marginally significant. For this age group, self-mastery and self-esteem were found to be protective factors, while chronic strains and urban residence increased the odds of having a CES-D score of 16 or higher.

For those who were 50 or above, the migration effect was still statistically significant even after controlling for 13 relevant variables. The odds of having a CES-D score of 16 or higher was more than 2 times as high for the designated migrants as for their non-migrant counterparts. Psychological resources decreased the odds as predicted by the stress process theory. The exposure to other chronic strains and being female increased the odds. Although gender was not found to affect the odds of having a CES-D score of 16 or higher for the middle-aged adults, among the old adults, the odds for females was more than two times as high as that of males. In addition, better physical function also lowered the odds of being at risk of clinical depression.

Summary of Results

Significant age differentials in migration effects were noted in the analyses. The TGP migration had the greatest negative effect on the oldest age group. These differentials were reduced but not eliminated after controlling for social and psychological resources, coping strategies, other stressors, and social demographic characteristics. However, no difference in migration-induced depression between the young and the middle-aged adults was detected. Our results partly supported the life cycle theory and highlighted the explanation power of the stress process model.

The stress process variables had direct protective effect for all three age groups. The effects of resources, however, were different in the various age groups. Social sup-

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port was not a significant protective resource for the young and the middle-aged adults; but it played a significant protective role for the old adults. Psychological resources were significant protective resources for all age groups. Political resources actually increased the depression level, rather than reduced it and only affected the young adults. Although coping measures played a protective role for two younger age groups, they showed no effects for the old adults. There were no significant resources and stressor interactions in all three age groups. Significant indirect effects were found for the old adults but not for the young and the middle-aged adults. The impending migration wore out the valuable social and psychological resources possessed by the old adults and thus indirectly led to higher depression level.

Clearly, the TGP involuntary migration had the most adverse mental health impact on the oldest age group. It greatly increased the odds for the risk of clinically significant depression. The observed age differentials in the migration effect seemed to reflect that: old people possessed fewer resources compared to other age groups, forced migration further taxed their social and psychological resources more than it did people of younger ages, thus resulting in greater stress level due to a combination of direct and indirect effects.

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CHAPTER 5

CONCLUSION AND DISCUSSION

Conclusion

Ten years after China embarked on the world's largest dam project on the Yangtze River and relocated more than three-quarters of a million people in the affected areas, there is still little empirical information about how the life of those already relocated and those not yet relocated are impacted. Although the social impact of the mass relocation effort has been given some attention by journalists and human rights observers, such discussions are often based on anecdotal evidence and speculation instead of systematic observations (see Xi, Hwang, and Qiao 2004 for a more extensive review).

As part of a larger effort to measure the social, economic, and psychological impacts of the TGP, this study examined the mental health impact of the project on a sample of Chinese residing in the affected region. An extraordinarily high level of depression has been found in the sample, not only for designated migrants, but also for those who do not have to move. Using Western standards, about three-fourths of the designated migrants and two thirds of the non-migrants are at risk of clinically significant depression. Because Chinese culture discourages the expression the emotional problems (Wu and Tseng 1985), the reported high depression level is not likely to be exaggerative.

Among this highly depressed group, are there any age differentials in the impact of the forced relocation? Using four perspectives of age to frame this study on project-induced involuntary migration, the goal of this dissertation is to find out which age group

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is most adversely affected in terms of mental health. We use data collected from a sample of Chinese who would be displaced by China's Three Gorges project (designated migrants) and non-migrants from the same region. This dissertation attempted to answer the following: how is the TGP-induced migration associated with depression across different age groups, and what roles the stress mediators play in the age differentiation. We first summarize the findings below.

This study found that the anticipated TGP-induced involuntary migration had the most adverse mental health impact on those who are 50 or above. Designated migrants of this age group show the highest depression level and have the highest risk for clinically significant depression. The impending migration does not make much difference in the mental health of the young and the middle-aged adults. The differences between the old adults and the two younger groups were reduced after controlling for social and psychological resources, coping strategies, other stressors, and social demographic characteristics. However, the controlling variables did not explain away all the age differentials, and the old adults are still affected by it most adversely.

The results of this dissertation study provide partial support for the prediction of the life cycle theory in terms of age differentiation in migration-induced depression, but render no support to the prediction of maturity theory and the cohort effect perspective. The results particularly highlight the explanation power of the stress process model.

The life cycle theory highlights the importance of the age patterned needs in human life. Old people's needs for assistance make them more dependent on their social network. The anticipation of the migration wore out their perceived social support. It is no wonder why old designated migrants are much more depressed than their younger

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counterparts and old non-migrants. Life cycle theory also leads us to expect that the young adults will be least adversely affected by the TGP migration, because the TGP migration means new life opportunities for them. However, we did not find a significant difference between the young and the middle-aged adults, whose life needs are different from each other.

Although older migrants are supposed to be better protected from stress due to their maturity and their unique cohort experiences, the findings from our analyses failed to support such speculators. However, because we did not have direct measures for human maturity level, or historical events experienced by different cohorts, we could not conclude that there was no maturity effect or cohort effect. It is possible that maturity and the unique cohort experience did protect the old adults form distress, but these effects were too small compared to the effect of life cycled needs and stress mediators and thus they were overwhelmed. In other words, if we had measures of maturity and cohort effects and control them in our model, we might have detected a more significant age differential in migration effect.

The detected age differentials were partially attributable to the role of stress mediators, as predicted by the stress process theory. Although these mediators generally protect the three age groups independently and directly, they were not of the same importance for different age groups. Moreover, we only found, among the old adults, significant indirect effects of the impending migration via mediators. Specifically, social support was not a significant resource for the young and the middle-aged Three Gorges residents. However, it was very important for the old adults to protect them from depression for both migrants and non-migrants. Moreover, for the old age group, social support not

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only worked as a protective resource, independent of the presence or absence of the stressor, it also mediated the effect of the TGP involuntary migration on depression. The TGP weakened the social support of the old adults, which in turn deteriorated their mental health.

Mastery and self-esteem were significant protective resources for all three age groups. However, the exposure to the TGP-induced migration negatively affected mastery and self-esteem only among the old respondents, which in turn worsened their mental wellbeing.

Political resource was found to associate significantly with depression only for the young adults but not for the old and the middle-aged adults. Contrast to our expectation, even for the young adults, the political resources did not protect those who possessed it from depression but rather increased the risk. It is understandable because the political resources in China are highly localized and short-lived (Wei 1999), which means that any political resources these local cadres amassed were likely to be lost as their term expires and when they were relocated to a different community. The TGP was more stressful to those who have much to loose.

As a general coping strategy, those who resorted to positive comparison usually had a lower level of depression. However, this result was only found for the young and middle-aged groups but not for the oldest age group. The endorsement of the government's propaganda as a positive coping strategy was effective only for the middle-aged adults, but not for the other two age groups. For the old adults, it seems that they were excluded from the benefits.

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In short, although these resources and coping generally protect the three age groups independently, the protective resources were weakened by the impending migration only for the old adults, the group who needed them the most. Thus, the old adults were at greater risk not only because of their lower level of resources, but also because the TGP tended to reduce the limited resources the older people possess. A combination of direct and indirect effects of the impending forced migration put the old designated migrants into the most disadvantaged situation.

Discussion

Anticipation of an Involuntary Migration

It is well-documented that migration is usually a stressful life event. This dissertation study makes it clear that, for the old designated migrants, forced migration as a stress process does not start with a physical move, but begins way before migration actually takes place. Our survey was conducted two years before the estimated moving date of most participated designated migrants. Anticipation of the migration had already worn out old designated migrants' valuable resources and put them in a depressive condition. By examining the distress associated with anticipation of a forced migration, this study enriches the literature and expands the general scope of migration study.

Contamination Effects

As indicated in Table 1, the entire sample had an extraordinarily high mean depression score (21.28), and 69 percent of the respondents were at the risk of clinically significant depression. The findings were stunning because not only the designated mi-

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grants but also non-migrants showed high depression level. The high depression level among non-migrants was likely the result of contamination effects (Lieberson 1985). Firstly, the TGP region has been economically depressed for decades because of the possibility of submerging. Nobody is free of the effects. Secondly, although not everyone who resides in the region is required to relocate, most family in the affected region have relatives who have to move. In our sample, 55.86 percent of the non-migrant families had relatives who had already moved or would move in a few years. As a result, non-migrants may also be affected by the project in terms of social network. Moreover, non-migrants are not completely exempted from the negative externalities created by the arduous dam project. For example, communities adjacent to the areas that would be flooded are disturbed not only by the construction activities taking place nearby and in their own community to accommodate waves of relocated migrants seeking a temporary refuge, they are also expected to be impacted by tensions arising from the government's imposed redistribution and sharing of limited land and housing resources with their new neighbors. Thus, even for those residents in the region who are exempted from the government imposed relocation, their lives would be affected by the TGP to a certain degree as a result of the ripple effects, necessitating some of them to make secondary migration (Wei 1999).

Therefore, the contamination effects increase the depression level of the non-migrants and reduce the mental health gap between migrants and non-migrants. Although everybody is affected by the TGP, the old designated migrants are most adversely affected.

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Structure and Culture

Pearlin (1989) argues that the "distinguishing mark of sociological inquiry is its effort to uncover patterns and regularities shared by people whose social characteristics and circumstances are similar" (p. 242). An important motivation for much of the mental health research conducted by sociologists has been the persistently observed associations between psychological distress and disorder and individual's status in stratified social structure (Turner and Lloyd 1999), such as age (Mirowsky and Ross 1992).

Old people generally are disadvantaged in a lot of aspects such as physical health, education level, and economic status. They usually possess less social and psychological resources. All these disadvantages form a life condition under which, for the old designated migrants, the forced migration will take place. The involuntary migration further damages the valuable resources possessed by these old people, and deteriorate their mental health. Old people's disadvantaged positions in social structure foretell their worst mental health outcome when anticipating the involuntary migration.

Another aspect that distinguishes sociological study of mental health form the biomedical model is that sociologists pay special attention to the culture component. Cultural environment provides the meaning for individuals to explain life conditions experienced. It also affects the research process, for example, the instrument for measurement.

This study shows that despite the fact that the stress process model is a theory rooted deeply in Western culture and has been applied primarily to examine the impact of voluntary migration; the model applied just as well to an Eastern society and to a category of migration that is qualitatively distinct. Although some researchers suspect that Asians express their mental health condition differently from people living in Western

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culture, our analysis demonstrated that the theoretical concepts of the stress process model could be measured reliably with anticipated reliability and construct validity using our Chinese sample.

This study also enriches the stress process model by identifying new indicators of stress mediators that are culture-specific and stressor-specific. Although the theoretical importance of party and cadre membership as political resource in China has been recognized in sociological literature (Bian and Logan 1996; Nee 1989; Walder 1995), its value as a stress mediator is first explored here. However, we find that having families and relatives in China's ruling party and cadre increases the depression level among the young adults and do not have any noticeable effects for the other age groups. We also identify a coping mechanism with specific utility for the stressor of interest by showing that respondents who show greater support for the Three Gorges Project are less likely to be depressed by the project's negative repercussions.

Moreover, although the bivariate finding agrees with our belief that China's huge and persistent urban-rural inequality (Cheng and Sheldon. 1994; Solinger 1999) can translate into differential treatment of urban and rural migrants, which in turn affects the psychological well-being of urban and rural migrants differently, controlling for age, the rural-urban differences disappear. Possibly, the observed difference between rural and urban residents results from the fact the there are more old people in the rural area because many young farmers have moved out of the region for better job opportunities elsewhere.

Finally, migration has long been an emotionally loaded word in Chinese culture. For thousands of years, the Chinese did not choose migration unless they were forced to.

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That is why most old TGP residents have lived in the area all their lifetime. For these old designated migrants, the anticipated migration means abandoning a land that had been called home for generations and permanently leaving the ancestors' graveyards where their spirit should rest after they die. The future life will be spent in a strange land as spiritually homeless. The traditional Chinese culture along with the disadvantaged position of the elderly in social structure shape the depressive experience of older designated migrants.

Limitations

Although the study from which the data utilized in this dissertation was designed to assess the mental health effects of involuntary migration using panel data, the planned post-migration survey has not been completed at the time of the analysis. As a result, this study reported only cross-sectional data based on the pre-migration survey. Without panel data, any causal conclusion about the effects of involuntary migration cannot be reached with certainty. The problem can be of special importance for stress research based on subjective measure of depression (i.e. CES-D) and resources (i.e. perceived routine support, mastery, and self-esteem). Cross-sectional data cannot disentangle the endogenity between depression symptoms and self-reported resources. Thus, when a negative association is found between depression and social support, for example, it is highly possible that it is the depression that leads the respondent to report a low level of resources (e.g., social support) rather than the other way around.

Furthermore, because the survey was initially driven by the stress process model instead of designated to test the life cycle, maturity, and cohort effect hypotheses, we are

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unable to test hypotheses derived from these theories adequately. Thus, unless we have better measurement of people's primary needs, their maturity level, and their actual experience of historical events, our testing of life cycle, maturity and cohort effect hypotheses cannot be conclusive.

Future Studies

It is clear that people of different age experience the anticipated migration differently. It is reasonable to expect that their experience with the physical relocation process and post relocation adjustment will also be different. After the completion of the follow up survey, future studies will examine the age differentials in the actual moving process and post relocation adjustment.

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APPENDIX A

DEMOGRAPHIC PROFILE OF HOUSEHOLD SAMPLE AND CENSUS 2000 FOR WRDR

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	Census 2000	TGP Sample
Gender (%)		
Male	51.92	0.50
Female	48.08	0.50
Age (%)		
0-14	21.84	15.23
15-64	70.15	75.27
65+	8.01	9.50
Education [a]		
primary school	43.36	40.85
middle school	29.47	32.87
highschool	8.60	14.25
college+	2.82	12.03
Residence [b] *(%)*		
Rural	66.91	0.52
Urban	33.09	0.48
Family size	3.23	3.87

[a] Census 2000 education is measured as "Population with various education attainment per 100,000 population". The sum of it is not the total population.

[b] rural residents number for the family sample is calculated by the number of rural family number times the mean size of rural family.

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APPENDIX B

MEANS, STANDARD DEVIATIONS, AND BI-VARIATE CORRELATIONS FOR DEPENDENT AND INDEPENDENT VARIABLES FOR THE YOUNG ADULTS (N=241)

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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Mean	SD
1 CES-D	0.79 *	0.03	-0.25 *	-0.39 *	-0.38 *	0.02	-0.31 *	-0.15 *	0.38 *	-0.01	0.16 *	0.05	-0.05	-0.10	-0.18 *	19.34	9.11
2 High Risk for Clinical Depression		0.00	-0.18 *	-0.27 *	-0.28 *	0.07	-0.27 *	-0.06	0.21 *	0.01	0.15 *	0.04	-0.07	-0.05	-0.04	0.61	0.49
3 Migration Status (Migrant=1)			0.01	0.01	0.04	0.14 *	-0.02	-0.14 *	0.03	0.12	0.09	0.08	-0.11	0.10	-0.06	0.57	0.50
4 Social Support				0.27 *	0.19 *	0.17 *	0.36 *	0.03	-0.11	-0.05	-0.01	0.01	0.00	0.11	0.06	35.18	6.98
5 Mastery					0.44 *	0.10	0.28 *	0.01	-0.18 *	0.07	-0.10	-0.16 *	-0.02	0.28 *	0.20 *	22.93	4.41
6 Self-Esteem						0.16 *	0.22 *	0.03	-0.14 *	0.06	-0.11 *	-0.14 *	-0.05	0.26 *	0.03	35.94	5.08
7 Political Resources							0.23 *	0.08	-0.03	0.07	0.06	-0.07	-0.22 *	0.36 *	0.01	0.71	0.46
8 Positive Comparison								0.10	-0.17 *	0.07	-0.05	-0.12 *	0.16 *	0.12	0.07	-0.30	2.10
9 Positive Coping									-0.09	0.05	0.06	0.17 *	0.10	-0.06	0.08	2.09	1.17
10 Chronic Strains										0.04	0.09	0.04	0.04	-0.11	-0.19 *	0.85	0.86
11 Gender (Female=1)											0.01	-0.23 *	0.00	0.06	0.05	0.48	0.50
12 Age												0.48 *	-0.07	-0.17 *	-0.07	26.90	3.25
13 Marital Status (Married=1)													0.01	-0.22 *	-0.05	0.78	0.41
14 Residence (Urban=1)														-0.45 *	-0.02	0.63	0.48
15 Education															0.08	9.47	2.93
16 Physical Function Status																39.70	1.54

* indicates a coefficient is significant at the .05 level.

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APPENDIX C

MEANS, STANDARD DEVIATIONS, AND BI-VARIATE CORRELATIONS FOR DEPENDENT AND INDEPENDENT VARIABLES FOR THE MIDDLE-AGED ADULTS (N=791)

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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Mean	SD
1 CES-D	0.74 *	0.05	-0.22 *	-0.48 *	-0.41 *	-0.07	-0.35 *	-0.22 *	0.37 *	-0.07	0.09 *	-0.06	-0.07	-0.14 *	-0.24 *	21.44	9.96
2 High Risk for Clinical Depression		*0.08 *	-0.13 *	-0.32 *	-0.22 *	-0.05	-0.19 *	-0.15 *	0.25 *	-0.02	0.04	-0.04	-0.11 *	-0.05	-0.10 *	0.69	0.46
3 Migration Status (Migrant=1)			-0.06	-0.01	0.00	-0.03	-0.06	-0.15 *	0.08 *	0.01	0.08 *	-0.07	-0.12 *	0.06	0.02	0.64	0.48
4 Social Support				0.22 *	0.24 *	0.14 *	0.28 *	0.16 *	-0.17 *	0.06	-0.13 *	0.17 *	0.03	0.14 *	0.13 *	33.42	7.40
5 Mastery					0.43 *	0.13 *	0.33 *	0.19 *	-0.26 *	0.03	-0.07 *	0.03	0.10 *	0.06	0.07 *	22.08	4.74
6 Self-Esteem						0.09 *	0.27 *	0.10 *	-0.13 *	0.06	0.00	-0.02	-0.09 *	0.22 *	0.08 *	35.83	4.92
7 Political Resources							0.13 *	0.12 *	-0.09 *	0.07 *	-0.02	0.00	-0.01	0.20 *	0.01	0.70	0.46
8 Positive Comparison								0.23 *	-0.30 *	-0.08 *	-0.16 *	0.11 *	0.19 *	0.08 *	0.14 *	-0.77	2.38
9 Positive Coping									-0.15 *	0.05	-0.08 *	0.04	0.27 *	-0.04	0.10 *	1.84	1.35
10 Chronic Strains										0.00	0.14 *	-0.26 *	-0.10 *	-0.06	-0.21 *	1.24	1.07
11 Gender (Female=1)											0.07	-0.04	-0.02	0.10 *	-0.01	0.39	0.49
12 Age												-0.09 *	-0.14 *	-0.16 *	-0.12 *	40.43	6.08
13 Marital Status (Married=1)													0.10 *	-0.02	0.03	0.95	0.23
14 Residence (Urban=1)														-0.46 *	0.02	0.48	0.50
15 Education															0.03	8.14	3.51
16 Physical Function Status																39.31	2.51

* indicates a coefficient is significant at the .05 level.

APPENDIX D

MEANS, STANDARD DEVIATIONS, AND BI-VARIATE CORRELATIONS FOR DEPENDENT AND INDEPENDENT VARIABLES FOR THE OLD ADULTS (N=498)

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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Mean	SD
1 CES-D	0.73 *	0.20 *	-0.43 *	-0.57 *	-0.39 *	-0.10 *	-0.41 *	-0.16 *	0.42 *	-0.24 *	0.10 *	-0.28 *	0.00	-0.25 *	-0.31 *	22.59	11.08
2 High Risk for Clinical Depression		0.22 *	-0.25 *	-0.42 *	-0.29 *	-0.05	-0.31 *	-0.10 *	0.30 *	-0.17 *	0.01	-0.17 *	0.01	-0.18 *	-0.17 *	0.71	0.45
3 Migration Status (Migrant=1)			-0.16 *	-0.09 *	-0.13 *	-0.05	-0.07	-0.15 *	0.11 *	0.03	0.07	-0.08	0.09 *	-0.13 *	-0.03	0.67	0.47
4 Social Support				0.32 *	0.20 *	0.14 *	0.35 *	0.13 *	-0.18 *	0.01	-0.05	0.07	-0.05	0.15 *	0.11 *	32.41	7.71
5 Mastery					0.36 *	0.17 *	0.35 *	0.12 *	-0.19 *	0.09	0.01	0.18 *	0.00	0.24 *	0.18 *	21.65	5.10
6 Self-Esteem						0.23 *	0.30 *	0.03	-0.16 *	0.10 *	-0.07	0.10 *	-0.14 *	0.30 *	0.14 *	35.85	5.22
7 Political Resources							0.19 *	0.00	0.00	-0.06	0.02	0.04	-0.23 *	0.20 *	0.06	0.76	0.43
8 Positive Comparison								0.10 *	-0.35 *	0.12 *	-0.07	0.21 *	0.05	0.26 *	0.19 *	-0.61	2.70
9 Positive Coping									-0.09 *	0.03	-0.04	0.10 *	0.25 *	-0.06	0.01	2.15	1.20
10 Chronic Strains										-0.13 *	0.02	-0.36 *	-0.13 *	-0.13 *	-0.19 *	1.37	1.12
11 Gender (Female=1)											-0.04	0.21 *	0.10 *	0.29 *	0.11 *	0.52	0.50
12 Age												-0.22 *	-0.17 *	-0.12 *	-0.44 *	61.25	7.90
13 Marital Status (Married=1)													0.10 *	0.15 *	0.17 *	0.85	0.36
14 Residence (Urban=1)														-0.33 *	0.09 *	0.44	0.50
15 Education															0.09 *	5.47	4.15
16 Physical Function Status																36.39	5.76

* indicates a coefficient is significant at the .05 level.

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APPENDIX E

REGRESSION ANALYSIS OF THE TGP INVOLUNTARY MIGRATION WITH SELECTIVITY CORRECTION FOR THE YOUNG ADULTS (N=241)

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Variable	OLS	Selectivity Corrected [a]
Migration Status (Migrant=1)	-0.37	-0.35
Social Support	-0.12	0.02
Mastery	-0.39 **	-0.55 **
Self-Esteem	-0.42 ***	-0.42 ***
Political Resources	2.91 *	2.86 *
Positive Comparison	-0.70 *	-0.64 *
Positive Coping	-0.81	-0.92 *
Chronic Strains	2.87 ***	-0.95
Age	0.31	3.41
Gender (Female=1)	0.04	-0.25
Marital Status (Married=1)	-1.41	-10.09
Residence (Urban=1)	-0.06	-0.97
Education	0.09	1.07
Physical Function	-0.37	0.50
Lambda	[b]	14.40
Constant	52.47 ***	-2.53
R-Sq	0.37	0.35

* indicates a coefficient significant at the .05 level.

**indicates a coefficient significant at the .01 level.

***indicates a coefficient significant at the .001 level.

[a] Selectivity Corrected Model is estimated using Kechman's (1979) estimator.

[b] =Variable not entered.

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APPENDIX F

REGRESSION ANALYSIS OF THE TGP INVOLUNTARY MIGRATION WITH SELECTIVITY CORRECTION FOR THE MIDDLE-AGED ADULTS (N=791)

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Variable	OLS	Selectivity Corrected [a]
Migration Status (Migrant=1)	0.41	0.44
Social Support	-0.03	0.07
Mastery	-0.58 ***	-0.48 ***
Self-Esteem	-0.42 ***	-0.42 ***
Political Resources	1.07	0.99
Positive Comparison	-0.36 **	-0.37 **
Positive Coping	-0.61 **	-0.56 *
Chronic Strains	1.84 ***	0.99
Age	-0.03	-0.24
Gender (Female=1)	0.53	3.89
Marital Status (Married=1)	0.62	-10.13
Residence (Urban=1)	0.74	-0.20
Education	-0.22 *	-0.91
Physical Function	-0.53 ***	-1.52 *
Lambda	[b]	-19.59
Constant	69.16 ***	132.94 **
R-Sq	0.39	0.39

* indicates a coefficient significant at the .05 level.

**indicates a coefficient significant at the .01 level.

***indicates a coefficient significant at the .001 level.

[a] Selectivity Corrected Model is estimated using Kechman's (1979) estimator.

[b] =Variable not entered.

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APPENDIX G

REGRESSION ANALYSIS OF THE TGP INVOLUNTARY MIGRATION WITH SELECTIVITY CORRECTION FOR THE OLD ADULTS (N=498)

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Variable	OLS	Selectivity Corrected [a]
Migration Status (Migrant=1)	1.99 **	2.17 **
Social Support	-0.29 ***	-0.29 ***
Mastery	-0.71 ***	-0.67 ***
Self-Esteem	-0.33 ***	-0.31 ***
Political Resources	1.29	1.41
Positive Comparison	-0.25	-0.28
Positive Coping	-0.55	-0.54
Chronic Strains	1.69 ***	1.79 ***
Age	-0.01	-0.34
Gender (Female=1)	3.16 ***	-1.93 *
Marital Status (Married=1)	-1.89	-2.34 *
Residence (Urban=1)	-1.01	-2.12
Education	0.04	-0.27
Physical Function	-0.29 ***	-0.44 **
Lambda	[b]	3.44
Constant	69.69 ***	73.34 ***
R-Sq	0.54	0.54

* indicates a coefficient significant at the .05 level.

**indicates a coefficient significant at the .01 level.

***indicates a coefficient significant at the .001 level.

[a] Selectivity Corrected Model is estimated using Kechman's (1979) estimator.

[b] =Variable not entered.

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APPENDIX H

PAIR-WISE T-TESTS OF THE INDEPENDENT EFFECT OF STRESS PROCESS VARIABLES

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	t[a]						
	Social Support	Mastery	Self-Esteem	Political Resources	Positive Comparison	Positive Coping	df
Young vs.Middle-Aged Adults	-1.12	0.21	0.00	-1.30	-1.09	-0.42	1030
Young vs.Old Adults	1.70	2.05 *	-1.00	-1.73	-1.42	-0.50	737
Middle-Aged vs. Old Adults	4.06 *	1.32	-1.31	-0.74	-0.54	-0.19	1287

[a] All figures under t[a] are t-values. t value is calculated by the fomular:=(b_1 -b_2)/ sqrt(se_1^2+se_2^2), where b,refers to the slope for the first-mentioned group, and b_1, the second-mentioned group.

* significant at .05.

GRADUATE SCHOOL
UNIVERSITY OF ALABAMA AT BIRMINGHAM
DISSERTATION APPROVAL FORM
DOCTOR OF PHILOSOPHY

Name of Candidate Juan Xi

Graduate Program Medical Sociology

Title of Dissertation Age Differentials in the Involuntary Migration-Induced Distress

I certify that I have read this document and examined the student regarding its content. In my opinion, this dissertation conforms to acceptable standards of scholarly presentation and is adequate in scope and quality, and the attainments of this student are such that she may be recommended for the degree of Doctor of Philosophy.

Dissertation Committee:

Name		Signature
Sean-Shong Hwang	**, Chair**	
Patricia Drentea		
Timothy B. Elliott		
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