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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Sociology

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Pathways to mental health in young adulthood and beyond: The long-term effects of
childhood experiences expressed through self-esteem

(Thesis format: Monograph)

by

Haosen Sun

Graduate Program in Sociology

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts

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Abstract

Utilizing the stress process paradigm and the life course perspective, the present study examines whether and how experiencing economic strain and family instability in adolescence has long-term effects on depressed affect (one component of psychological distress) in young adulthood. Using the 1992-1994 and 2000-2002 waves of the National Survey of Families and Households (NSFH), this research focuses on children age 10-17 in 1992-1994 who also participated in the 2000-2002 follow-up survey as adults, aged 18 and above (N=868). Results from multiple regression models suggest that both economic strain and family instability in adolescence may impair individual's development of self-esteem and subsequently lead to higher levels of depressed affect in young adulthood. Multiple pathways to depressed affect in adulthood are also identified within the life course stress process model, involving adult social statuses, family support and self-esteem. Results suggest that social programs geared toward helping adolescents who face economic strain and family instability should pay more attention to protecting and promoting the development of self-esteem.

Keywords

Stress Process, Life Course, Linked Lives, Agency, Stress Exposure in Adolescence, Depressed Affect, Psychological Distress, Self-esteem Development.

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Chapter 1

1 Introduction

The stress process paradigm (Pearlin, 1989) takes into consideration the stress exposure, stress mediators, and stress outcomes. Stress exposure, as part of normal life, is related to one's location within social structures, social institutions and interpersonal relationships. Within stressful situations, stress mediators like coping and social support may help limit the number, severity, and diffusion of stressors, which can make a difference to the outcomes of stress.

Within the stress process paradigm, the life course perspective has inspired research to trace the disparities in physical and mental health outcomes back to previous experiences and stress exposure. Individuals' stress exposure can be the result of cumulative processes throughout the life course. Research on cumulative advantage/disadvantage processes has suggested that long-term accumulative patterns of stress exposure may follow processes of path dependence, duration dependence and/or joint stressors. Less is known, however, about how stress mediators operate throughout the life course and affect stress outcomes.

“Linked lives” is also a key concept in within the life course perspective. Linked lives and the interpersonal connections they involve could be sources of stressors. Family members are likely to be exposed to common stressors, and one family member's stressful experience can easily affect other members. Within these processes, the quality of interaction between family members can also be compromised. Meanwhile, linked lives may also operate as stress mediators. Support from family members including parents and grandparents can benefit individuals in different ways. They may protect individuals from the consequences of stress exposure, influence one's later social statuses and stress exposure, and even alter one's life trajectory.

The life course perspective also suggests that “agency” plays a role in the stress process. Individual agency operates within the social structure, and high levels of agency can buffer the impact of stress and motivate active coping strategies, while ineffective agency

would possibly impair the willingness to engage in coping efforts and lead to greater vulnerability to stress. Agentic coping can modify life trajectories as part of cumulative processes, leading to different outcomes in terms of social status and mental health. Meanwhile, because agency has structural constraints, it can be further supported or diminished by subsequent stress exposure as well as support or lack of support from a family member.

Inspired by the life course concepts of “linked lives” and “agency,” the present research examines underlying pathways in the stress process in young adulthood and beyond, especially the dynamics of stress exposure, support and coping resource. To achieve this goal, the following questions are addressed: 1) Does stress exposure in adolescence affect mental health status in adulthood? 2) In adulthood, are social statuses and stress exposures associated with mental health in adulthood, mediating the effect of stress exposure in adolescence? 3) Do perceived support and coping resources operate as part of the life course stress process—and if so, how? Can they mediate the possible effect of stress exposure and social status on adult mental health? Are agentic coping resources influenced by stress exposures, social status and linked lives across the life course? Do adolescent agentic coping resources persist into adulthood?

Chapter 2

2 Background and literature review

The stress process paradigm, especially when combined with the life course perspective, has inspired research connecting previous experiences with physical and mental health outcomes throughout the life course. The stress process paradigm (Pearlin, 1989) was first designed to incorporate people's social statuses into stress research to better satisfy sociological interests, with a three-fold consideration about stress exposure, stress mediators, and stress outcomes. It further suggests that exposure to stressors is related to one's location within social structures, social institutions and interpersonal relationships (Pearlin, 1989). In this way, being exposed to stressors—including stressful life events and chronic strain—is part of normal life. Meanwhile, stressful life events and chronic strain overlap to form “stress constellations” (Pearlin, 1989). In the stress process, stress mediators like coping and social support may help limit the number, severity, and diffusion of stressors, which can make a difference in the stress outcomes.

The stress process model is further developed with the help of the life course perspective. Pearlin and colleagues (2005) have introduced three mechanisms of stress exposure across the life course. First, life circumstances and social status can set individuals onto different pathways of social status development and stress exposure; second, long-term or repeated hardships—including economic strains and discriminatory experiences—have enduring effects on one's outcomes; and third, the stress proliferation process can expand across the life course, which means that disadvantages across the life course—including traumas with enduring effect, timing and sequencing of transitions, and life-course disruptions—can elevate the risk of experiencing other “secondary stressors” in later life (Pearlin et al., 2005; Pearlin, 1989). These proliferated stressors, along with the original stressors, can also contribute to disparities in outcomes. The social status pathways, the enduring hardships and the stress proliferation process are intertwined and set the landscape of long-term stress exposure. In this way, from the life course perspective, the stress process suggests that the disparities in later life may be anchored to earlier circumstances in different ways (Pearlin et al., 2005). In addition, as people move

through their life course, the nature and quality of both acute stressors and chronic stressors may change with age as well (Pearlin & Skaff, 1996).

The stress process paradigm, informed by the life course perspective, can be a powerful tool for modeling life history, helping to better explain later mental health disparities. In the stress process paradigm, the association between stress exposure and the life course perspective is further complemented by life course research on cumulative processes. Meanwhile, the roles of “linked lives” and “agency” as key concepts in the life course perspective (Elder, Jr., 1994) are less explored facets of the life course stress process. Introducing “linked lives” into the stress process would shed new light on stress exposure and social support. Likewise, individual agency, developed throughout the life course, and related coping strategies should also be taken into consideration. By evaluating the stress process from the life course perspective, current research could examine the connection between adolescent stress exposure and later mental health outcomes in adulthood, and how support from linked lives and agentic coping resources would affect this connection in particular.

2.1 Stress process in Cumulative Advantage/Disadvantage perspective

Life course research on Cumulative Advantage/Disadvantage (CAD) has further enriched the stress process paradigm. The disparities in later health and mental health outcomes created by early life experiences are a major concern of research on cumulative processes (Dannefer, 2003; DiPrete & Eirich, 2006). To explain this diversity, CAD focuses on describing the processes of advantage or disadvantage experienced by an individual or group over time (DiPrete & Eirich, 2006). These processes are carried out by a combination of interrelated mechanisms across the life course including path dependent processes, duration dependent processes and joint stressors processes. In this way, one’s stress exposure can be the result of cumulative processes throughout the life course.

2.1.1 Path dependent processes

A path dependent process suggests that early previous life disadvantages can affect long-term consequences directly and indirectly by setting in motion a series of additional

disadvantages and putting people on different life trajectories. In the research on the association between the timing of educational attainment and wage differentials at middle-age, Elman and O’Rand (2004) have demonstrated both cumulative advantage and disadvantage pathways from social origins to educational achievement, and further, to wage status in midlife. Another example is that childhood disadvantage and illness have enduring effects on the risk for later life heart attacks—a trajectory that is mediated by adult pathways (Hamil-Luker & O’Rand, 2007; O’Rand & Hamil-Luker, 2005). Similar mechanisms have also been identified in the association between earlier social conditions and multiple mid and later life outcomes such as men’s mortality (Hayward & Gorman, 2004) and women’s psychological distress (Kuh, Hardy, Rodgers, & Wadsworth, 2002). It is clear that earlier disadvantages have enduring effects partly by setting the pathway to later disadvantages, while creating disparities in later outcomes.

2.1.2 Duration dependent processes

As earlier life disadvantages affect later outcomes directly and indirectly, the duration of exposure to hardships also makes a difference in the cumulative process. For example, in their investigation of the dynamic relationship between poverty histories and self-rated health trajectories, McDonough and Berglund (2003) have documented how the health status of those who have experienced long-term poverty is particularly compromised. Later research has shown that different poverty experience patterns (stable non-poor, exiting poverty, entering poverty and stable poor) have distinct effects on health trajectories, and such gaps in health tend to stay constant over time (McDonough, Sacker, & Wiggins, 2005). By examining long-term interactions between health and social-economic trajectories, Willson, Shuey and Elder's (2007) research has observed both path dependent and duration dependent processes. In sum, the duration of the adverse circumstance plays a unique role in cumulative processes.

2.1.3 Joint Stressors Processes

Following the pathway process and duration dependent process, different kinds of stressors work together to affect health and mental health outcomes. Turner and Lloyd (1995) have examined lifetime experiences of trauma, showing the mental health

significance of cumulative adversity. At the same time, a comprehensive measurement of stress exposure history, including stressful life events, chronic stressors and major lifetime traumas, has strong explanatory power on observed diversity in mental health (Turner, Wheaton, & Lloyd, 1995). Turner and Avison (2003) also suggest that a broader measurement of stress, including recent life events, chronic stressors, lifetime major events and discrimination stress, can more accurately measure stress exposure than life events checklists alone. A comprehensive measurement can help capture multiple stress processes and identify their association with disparities in multiple outcomes.

2.2 The role of linked lives in the stress process paradigm

While research on stress process and cumulative advantage/disadvantage tends to take an individualistic perspective by focusing on an individual's exposure to stressors, incorporating linked lives into the stress process can provide a more comprehensive view. Inspired by the life course perspective, the concept of linked lives suggests that human lives are embedded in a social network consisting of kin and friends across the life course (Elder, Jr., 1994). One prominent part of the social network is the connections between family members. Family members in a household usually share the same living circumstances, including exposure to stressors and access to resources. Family connections also engender chains of interdependence, as one's transition can create life changes in other family members, and one's problems can proliferate into secondary stressors faced by other family members (Avison, 1999, 2010; Hagestad, 2003; Pearlin et al., 2005). In this way, linked lives can be both primary and secondary sources of stressors. In addition, linked lives are also sources of support to family members.

2.2.1 Linked lives as a primary source of stressors: shared context and interaction

From the standpoint of children, many adversities and disadvantaged statuses are located within the family. Family structure and its stability is a key characteristic of the family environment. Family structure/composition is experiencing more heterogeneity and instability as part of the "second demographic transition," which has generated a series of acute and chronic health and mental health consequences, especially for children (Avison,

2010). With respect to acute effects, research has shown that children who live in divorced, single-parent families are likely to suffer a poorer self-concept (Parish & Wigle, 1985) and have a higher risk of getting involved in accidents and injuries that require medical attention (Currie & Hotz, 2004). Also, children living in single-parent and cohabiting families are more likely to experience abuse and neglect (Berger, Paxson, & Waldfogel, 2009) and those who live with a stepmother receive significantly less routine medical examinations (Case & Paxson, 2001). Chronic effects of family structure experiences have also been observed. Experiencing parental divorce can have long lasting effects on children's psychological wellbeing, educational and economic attainment and family formation (Amato, 1994; Chase-Lansdale, Cherlin, & Kiernan, 1995; Cherlin, Chase-Lansdale, & McRae, 1998; Glenn & Kramer, 1985; Wallerstein, 1985).

The mechanisms bridging family structure and family members' outcomes can be generally organized into two main categories: family SES/resources and family interaction. Family SES and parents' resources, which are partly affected by family structure, have both acute and chronic effects on children's health and mental health outcomes. SES embodies a wide array of resources including money, knowledge, prestige, power, and social connections regardless of time and mechanisms (Phelan, Link, & Tehranifar, 2010). With these flexible resources, SES can also reproduce itself over time and work at both individual and familial levels (Phelan et al., 2010). Single parent families are likely to have fewer resources and a poor living context, and exits from marriage and cohabitation are usually accompanied by a decline in the mothers' economic well-being (Brown, 2004; Thomas & Sawhill, 2005).

Besides the effect of family SES/resources, the unique role of family interaction should also be considered. Problems in family interaction can be key stressors for children, especially when it comes to the parenting style and the parent-child relationship. When parenting is harsh, punitive, detached or neglectful, it will negatively affect children's well-being and developmental outcomes (Aquilino & Supple, 2001; Turner, Irwin, & Millstein, 1991; Waldfogel, Craigie, & Brooks-Gunn, 2010). One aspect of family interaction quality is the time children spend with their family—in other words, the time resources of parents that are devoted to their children. The quality of family interaction is

related to children's health, development, substance abuse and delinquency, and can be more influential than family structure (Adlaf & Ivis, 1997; McLanahan & Sandefur, 1994). For example, chronically troubled children who stay in intact but unhappy families can share similar problems with children who have experienced parental divorce (Parish & Wigle, 1985).

2.2.2 Linked lives as a secondary source of stressors: stress proliferation between family members

People sharing the same family circumstance can also experience stress proliferation between one another. In other words, primary stressors experienced initially by some members can develop into secondary stressors for other members, possibly in different forms (Pearlin et al., 2005; Pearlin, 1989). In some cases, besides serving as primary stressors, the quality of family interaction can also be traced back to structural contexts and be defined as secondary stressors at the same time. For instance, compared with their married counterparts, single and cohabiting mothers are more likely to suffer more stress and psychological problems and thus function less well as parents (Brown, 2004; Friedlander, Weiss, & Traylor, 1986; Osborne, 2004). Also, instability in family structure may increase parental stress levels, impair parenting behaviors, and threaten children's physical and mental health outcomes (Beck, Cooper, McLanahan, & Brooks-Gunn, 2010; Cavanagh & Huston, 2006; Cooper, McLanahan, Meadows, & Brooks-Gunn, 2009; Cooper, Osborne, Beck, & McLanahan, 2011; Fomby & Cherlin, 2007; Osborne & McLanahan, 2007). Similarly, changes in a parent's occupational or employment status can also affect a child's home environment, including cognitive stimulation, maternal responsiveness, and physical environment (Menaghan & Parcel, 1995). Considering secondary stressors across linked lives is crucial in understanding the stress proliferation process, as one's transitions in the life course can become another's hardship, immediately or with the passage of time (Pearlin et al., 2005).

2.2.3 Linked lives as a source of stress mediator: support

As sources of primary and secondary stressors, linked lives play a unique role in stress exposure within social structural contexts; however, their role as a stress mediator is often

overlooked in current literature. As social support serves as a key mediator in the stress process (Pearlin, 1989), taking linked lives into consideration can further complete the model. Attention should be paid to both the donors and the recipients of support, especially their relationship and interaction, which affects the form, reciprocity, stability and efficiency of support (Pearlin & Skaff, 1996; Pearlin, 1989). Evaluating these aspects of support across linked lives can further reveal stress buffering mechanisms and the stress process across the life course.

From the standpoint of a child, a common source of support is the parents or other elder generation guardians, who are responsible to provide day-to-day care, offer emotional and practical support, and maintain a supportive family atmosphere. Having warm and nurturing parents with an accepting, helping, firm and democratic parenting style may lead to better outcomes for children, including higher educational achievement, more self-reliance, lower anxiety and depression levels, and lower probabilities of engaging in delinquent behavior (Astone & McLanahan, 1991; Catalano et al., 1992; Steinberg, Mounts, Lamborn, & Dornbusch, 1991; Waldfogel et al., 2010).

At the same time, grandparents can also offer some support. To investigate family dynamics, Hetherington and Stanley-Hagan (1999) have mentioned a family system approach that takes extended family members into consideration, such as custodial fathers, non-custodial parents, siblings, and grandparents. As longevity has increased the length of grandparenthood—itsself a consequence of the second demographic transition—attention to the role played by grandparents is becoming increasingly relevant (Bengtson, 2001; Szinovacz, 1998). Grandparents may benefit both their children and grandchildren by providing coping resources for family stress, offering practical assistance and emotional support, and positioning themselves as role models (Barranti, 1985; Bengtson, 2001).

The complexity of the interaction between grandparents and grandchildren is also noteworthy. Support from grandparents has multiple forms and characteristics, and can make a difference in recipients' living circumstances. Grandparents can help their grandchildren by helping their own children. In this process, grandparents usually help

“needier” and disadvantaged children more without expecting help or financial benefit in return (Fingerman, Sechrist, & Birditt, 2012), and help is more likely to flow downward from grandparents to their children than *vice versa* (Grundy, 2005). The form of support may also vary, as single young adults receive more advice from parents than their married counterparts, and those with children of their own receive more practical support (Bucx, van Wel, & Knijn, 2012). A special form of support is the formation of multi-generational households, which is a result of economic, demographic, and cultural factors (Choi, 2003; Cohen & Casper, 2002; Kamo, 2000). Living in such households can benefit teenage mothers’ economic self-sufficiency, schooling and employment (Eshbaugh, 2007; Gordon, Chase-Lansdale, & Brooks-Gunn, 2004; Gordon, 1999), which would further improve children’s living circumstances.

Support from grandparents can benefit grandchildren’s development directly. Children who enjoy close relationships with grandparents have fewer emotional problems and adjustment problems in family transition, and more pro-social behavior, especially for African Americans or children from single parent families (Attar-Schwartz, Tan, Buchanan, Flouri, & Griggs, 2009; Attar-Schwartz, Tan, & Buchanan, 2009; Denham & Smith, 1989; Lussier, Deater-Deckard, Dunn, & Davies, 2002; Ruiz & Silverstein, 2007). Grandparent involvement can also protect children against economic hardships and poor parent-child relationships, which are considered as risks for reduced social competence and elevated externalizing behaviors (Barnett, Scaramella, Neppl, Ontai, & Conger, 2010a, 2010b), as well as moderate the transmission of maternal depression to children (Silverstein & Ruiz, 2006).

At the same time, the relationship between grandparent and grandchild, or the availability and quality of grandparents’ support, is affected by a series of factors, including the grandparent–parent relationship (Barnett, Mills-Koonce, Gustafsson, & Cox, 2012; Barnett et al., 2010a; Whitbeck, Hoyt, & Huck, 1993), children’s family structure (Attar-Schwartz, Tan, Buchanan, et al., 2009; Creasey, 1993; Lussier et al., 2002), the distance between households and contact frequency (Compton & Pollak, 2013; Creasey, 1993), the age/life stage of both grandparent and grandchild (Creasey & Koblewski, 1991; Furman & Buhrmester, 1992; Silverstein & Marengo, 2001), gender (Clingempeel,

Colyar, Brand, & Hetherington, 1992; Creasey & Koblewski, 1991; Creasey, 1993) and race (Hirsch, Mickus, & Boerger, 2002). Considering such heterogeneity in the donor–recipient interaction is crucial to understanding the support from linked lives, which contributes to a better modeling of the stress process.

2.3 Coping and the stress process paradigm: Taking agency into consideration

As an important concept in the life course perspective, agency plays a critical role in the stress process as coping resources (Thoits, 2006). The exercise of agency can be understood as “evidence that people made choices or decisions, acted intentionally or deliberately, formulated and followed plans of action, or set goals and pursued them” (Bandura, 2001; Thoits, 2006). Agency can also be described as “planful competence” from three aspects: dependability, intellectual involvement, and self-confidence (Clausen, 1993; Settersten & Gannon, 2005). For these three aspects,

“It means knowing your strengths, limitations, and interests, and knowing what options are available and how to take advantage of them; it means being able to assess the actions and feelings of others, and to take these into account when interacting with others; most importantly, it means having goals and the self confidence to carry them out, coupled with a high degree of flexibility and openness to new experiences” (Settersten & Gannon, 2005, p. 40).

The level of agency and related agentic practices may be affected by multiple factors including one’s experience, ability, interests, self-esteem, mastery, optimism, positive personality characteristics like perseverance, and the absence of disabling mental disorder symptoms (Thoits, 2006). In stressful situations, exercising agency can take multiple forms as coping strategies, such as changing the stressful situation, managing the meaning of the situation, and keeping control of the symptoms of stress (Pearlin, Menaghan, Lieberman, & Mullan, 1981; Pearlin & Schooler, 1978; Pearlin, 1989; Thoits, 2006)

2.3.1 Coping by changing the stressful situation

Individuals with high levels of agency are more likely to take efforts to change the stressful situation for the better, and effective problem solving and improving the situation should significantly reduce or eliminate the distress (Pearlin & Schooler, 1978; Thoits, 2006). Kessler and colleagues (1989) have found that blue-collar workers barely suffer from any psychological consequences when losing a job if there are chances for reemployment, while this is not the case for white-collar workers since they may attach more meaning to their job. Another interesting finding in this research is that blue-collar workers with high distress are more likely to find a new job within a year, possibly due to a higher job-searching motivation (Kessler et al., 1989). Similarly, when it comes to job or love problems, individuals who can successfully solve the problems have less psychological symptoms than people who do not have such problems, while more psychological symptoms are observed for those who failed to solve the problem (Thoits, 1994). However, as the most direct way of coping, dealing with the source of stress is not a common strategy since one may not have a clear understanding of the situation, may lack the necessary ability to make a change, may be constrained by potential consequences of possible coping action, or may find that the situation is beyond one's control (Pearlin & Schooler, 1978).

2.3.2 Coping by managing the meaning of stressful situation

Besides making real changes, individuals can also change their understanding of threats to avoid or lessen the stress impacts, especially when the problems seem to be unavoidable and unsolvable. Possible strategies include making positive comparisons, selectively ignoring the stressor, and reordering life-priorities (Pearlin & Schooler, 1978; Thoits, 2006). Positive comparisons are made by restructuring the frame of reference, like comparing oneself with people in similar conditions, or considering hardship as improvement over the past or as a forerunner for a better future (Pearlin & Schooler, 1978). Making more positive comparisons is also related with "transformatory coping," by which people with similar experiences help each other or work together to bring positive changes in their lives, especially when facing inescapable, severe and rare stressors (Thoits, 2006). These people may form help groups to share information, advice

and emotional support, or to collectively voice their interests to society. In this process, new roles and more meaningful and satisfactory lives are created (Thoits, 2006).

At the same time, selective ignoring and reordering life priorities also contribute to meaning management when the stressors are relatively mild. People may devalue the stressful life domains and pay more attention to other easier ones, such as the substitution of rewards in occupational difficulties and devaluation of money in financial strains (Pearlin & Schooler, 1978). The rearrangement of life priorities using agency is also described as “compensatory coping,” which also means transferring resources to more satisfying or engrossing roles (Thoits, 2006). These roles may already exist or may be newly acquired, possibly through participation in activities such as volunteering, joining sports and religious groups, etc. (Thoits, 2006). Transformatory and compensatory coping strategies may not be as effective as problem solving ones, since they are more likely to lower the level of stress rather than absolutely eliminate it, but these agency-propelled approaches may lead to positive events that help reduce psychological distress (Thoits, 2006).

2.3.3 Coping by dealing with the stress symptoms

Compared with changing the stressful situation and managing its meaning, dealing with stress symptoms puts more emphasis on minimizing the discomforts and protecting individuals from being overwhelmed by stress than dealing with the problems (Pearlin & Schooler, 1978). Generally speaking, four strategies to manage stress symptoms have been identified, such as expressive ventilation of feelings instead of making controlled reflection; passive forbearance by avoiding conflict resolution instead of understanding the situation and taking actions; voluntarily taking a sense of helplessness and denying the possibility to exert influence in order to avoid the sense of failure and guilt; or simply holding firmly to optimism and faith (Pearlin & Schooler, 1978). These stress outcome management strategies can be used in different circumstances. They may work along with other coping strategies like problem solving and meaning management. People may take some of these measures when they mobilize available resources to change the stressful situation, when they cannot find a satisfactory solution for problems, when they occupy a new role, or when they start a new life style.

As applications of agency, different coping strategies may have different effects in the stress process. Coping strategies such as projection and denial are immature and counterproductive, while others are relatively more mature and effective, such as humor and anticipation (Shanahan, 2000). The maturity in coping may have long-term effects in later life, including job success, marital stability and life satisfaction (Shanahan, 2000; see also Vaillant, 1993), and such long-term effects of applying agency through coping should be further examined from the life course perspective.

2.4 Applying agency as coping throughout life course

Human agency can be exerted to deal with stress. Meanwhile, the development of agency and its long-term effect on the cumulative processes should also be examined. Social inequality, including inequality in mental health, is a product of long-term interactions between institutional arrangements, social structure and individual life trajectories (O’Rand, 1996). Individuals may have some sort of control over their life trajectories. Within changing contextual constraints, one’s agency and subsequent action will significantly affect one’s development and modify the pathway to cumulative advantages and disadvantages (Elder, Jr., 1994).

2.4.1 Agency in the social causation and selection process

Revealing how agency works in social causation and selection process would help explain its role in the stress processes throughout the life course. Previous research on health and mental health has intensively discussed the social causation and selection process, and the dispute has largely been about whether it is the social status or condition that caused the health/mental health outcome, or *vice versa* (McLeod & Pavalko, 2008). By comparison, a life course perspective rightly accounts for the reciprocal process of social causation and selection processes. It thereby avoids the meta-theoretical pitfalls of dichotomizing “structure” and “agency” (McLeod & Pavalko, 2008).

The reciprocal processes between social causation and selection are commonly found in cumulative advantage/disadvantage processes, as part of path-dependent process, duration dependent process, and the accumulation of stressors. For example, people’s prior work experiences may affect their physical and mental health, which in turn

influences their probability of being employed as well as the type of the job they hold. Those who cannot get a job due to health problems also risk losing the health benefits associated with paid work, like a health plan (McLeod & Pavalko, 2008). Additionally, children with mental health problems are more likely to have lower educational achievements, and thus tend to be exposed to more stressors in their early adulthood and beyond (McLeod & Pavalko, 2008). In this respect, the selection process can be seen as a possible extension of previous causation process, or “reverse causation”.

Agency and agentic coping are also part of a reciprocal process within the stress process. Advantages in social status can equip individuals with greater agency, including a more positive self-concept, higher levels of self-esteem and mastery, as well as more advantaged social statuses to exert (and often reproduce) them. It has been observed that psychological resources such as self-esteem, mastery, and perceived support are a crucial part of agency. Rather than being randomly distributed, though, they tend to be higher in advantaged groups and lower among disadvantaged groups (Thoits, 2006).

Conversely, being exposed to disadvantageous circumstances may impair agency and psychological resources. It has been observed that low income people usually have lower levels of perceived mastery and stronger beliefs in external constraints in their lives (Lachman & Weaver, 1998). Financial strain, low levels of social support and negative interactions with relatives affect psychological distress levels partly through changing one’s sense of personal control. For instance, financial strains are perceived as the inability to satisfy one’s personal and family needs and to control life events (Lincoln, Chatters, & Taylor, 2003). Similarly, long-term role strains are considered as evidence of the inability or failure to control one’s life, which impairs self-esteem and mastery and results in stress (Pearlin et al., 1981).

The advantage in agency as a psychological resource in turn leads to more preferable outcomes and more advantaged statuses. For example, to explain the positive association between educational achievement and health, Ross and Wu (1995) have pointed out that in addition to full time work and higher income, well educated individuals are likely to have more fulfilling work and having greater sense of control over their lives, plus

healthier life style and higher levels of social support. These agentic and psychological advantages then benefit one's health. Similarly, Syme (1998) has observed that health disparities also exist in people from upper classes who are free from poverty, which is best explained by different levels of control. People from relatively higher classes tend to have greater control, as a result of more training, opportunities, resources and skills to deal with problems, which lead to better health.

This agency-centered theoretical perspective elicits practical possibilities for intervention, suggesting that both youths and adults can acquire more appropriate and creative approaches to deal with problems in life using available resources to the fullest (Syme, 1998). The key in such intervention is to help people build self-esteem and mastery, and to engender hope by revealing potential options against stressors, instead of growing depressed by failure and giving up (Syme, 1998).

2.4.2 The buffering effect of agency

Possessing a high level of agency can buffer the effect of stress exposure. In face of stressful events or chronic strains, people with high self-esteem or sense of control will experience significantly lower anxiety and depressive symptoms (Thoits, 2006; see also Mirowsky & Ross, 2003). Also, Lachman & Weaver (1998) has observed that higher sense of mastery and lower perceived constraints is associated with eliciting higher life satisfaction, better perceived health and lower depression level, regardless of social class. Especially for individuals in lower social classes, individuals with a high sense of control enjoy health comparable to people in higher income groups, while lower class people do not (Lachman & Weaver, 1998).

This further reveals the possibility that agency is not totally the result of social causation processes. High self-esteem and mastery can still be beneficial even if they were somehow illusive. According to Taylor & Brown (1994), aggrandized self-perceptions, illusions of control, and unrealistic optimism are widely observed in human lives: aggrandized self perception is also a predictor of higher likelihood of success, which can be beneficial to the language acquisition and development of problem solving skills in young children, and can cushion the impact of stressful events. What's more, an illusion

of the ability to take control may be associated with the ability to adapt to stressful situations, and research supports that unrealistic optimism predicts positive social relationships, high motivation to productive work, and effective coping (Taylor & Brown, 1994). These findings further suggest that agency not only has psychological effects but also influences people's coping efforts.

2.4.3 Agency and coping efforts

Agency can change an individual's motivation to engage in coping efforts. Pearlin and Schooler (1978) have argued that people's psychological resources such as self-esteem and mastery represent *who they are*, while coping is defined as *what they do*; both of which serve as independent stress mediators. Meanwhile, one's agency is closely related to one's motivation, decision making and coping behaviors, which possibly leads to different stress outcomes (Thoits, 2006). In other words, *who people are* would predict *what they do* in practice.

People with higher levels of agency, self-esteem and mastery are more motivated to utilize strategic coping efforts against stress. This may reap various health and mental health benefits in return. As occupational qualities as well as related social and marital integration levels change the status of psychological control, individuals may adopt different health behaviors, which affect subsequent health status (Wickrama, Lorenz, Conger, Matthews, & Elder, 1997). In adverse situations, having some sense of control can motivate individuals to take action and work hard to make changes instead of feeling apathetic and hopeless, even when there is no guarantee of success (Lachman & Weaver, 1998). Likewise, people possessing higher levels of self-esteem and perceived social support are more likely to take coping efforts, including problem reversals, extrications, transformations and compensations, which have significant stress buffering effects (Thoits, 2006).

Even making the effort *per se* can be meaningful in some circumstances, regardless of the results. As Thoits (1994) has observed, psychological distress level (and subsequent personality characteristics) are not only affected by the *result* of problem-solving (in the work domain) but also by whether *attempts* are made to solve the problems or not (in the

love domain). It suggests that making some efforts against stressors, even if they fail or are not as effective as expected, may alleviate psychological distress to some extent.

In contrast, low levels of agency and deteriorated self-concept can translate into greater hesitation in undertaking coping efforts, which may lead to greater psychological distress. Such lack of agency can even make potential abilities and resources useless in the face of stressful situations. Thus, Wheaton (1980) has distinguished the ability to cope from the effort to cope. In his analysis, distinguishing “impairment in ability” from “impairment in effort” is crucial to understanding the pathways of coping and its association with psychological disorder. Exposure to stressors, like experiencing low SES in childhood or adult life, can affect individuals’ causal perceptions of life experiences. Changes in perceptions, such as acquiring a more fatalistic worldview, will impair individuals’ willingness to enact coping efforts and make them more vulnerable to psychological distress, even if their coping abilities remain intact (Wheaton, 1980).

2.4.4 The long-term effect of agency

Exercising agency as a form of coping with stressors may have long-term effects by continuously changing one’s life trajectory (McLeod & Pavalko, 2008). Individuals with adequate coping resources are more likely to anticipate the development of problems, and take preventative and proactive measures against potentially controllable negative events (Thoits, 2006). In this way, they are likely to experience fewer avoidable negative events and are more likely to experience positive events, which gradually eliminates long-term strains and benefits one’s access to resources and ability to exercise agency, and is protective of mental health (Thoits, 2006). In contrast, individuals who fail to anticipate problems or engage in ineffective coping are more likely to be on a pathway to cumulative disadvantage (Thoits, 2006). Without sufficient agency, one’s stress symptoms, personal characteristics and behaviors work with the social context to “produce” more negative events that could have been avoided, making the situation even worse (Hammen, 1991; Thoits, 2006).

As the long-term effect of agency works in accordance with the cumulative advantage and disadvantage process, one’s development of agency and coping strategies could serve

as a map leading towards a better life and future achievements in the long run. As Wheaton (1980) suggested, coping is a long-term process that is learned through socialization. It is relatively persistent and does not change rapidly. Early acquirement of agency as planful competence in adolescent years is crucial for one's development throughout the life course (Shanahan, 2000). From the longitudinal observation of the Ypsilanti Preschool Program, poor black children who participated in training to solve problems in the face of difficulties and failure early in life (3 and 4 years old) showed a significant advantage in well-being compared with their counterparts in the same cohort, and the advantage persisted into young adulthood (Syme, 1998). The benefits of such acquired mastery and knowledge about "how to succeed" tend to accumulate over time as part of cumulative advantage and disadvantage (Syme, 1998).

Other research suggests that agency would propel the cumulative process by affecting one's developmental trajectory step-by-step from the beginning. Mortimer and colleagues (2005) have observed that agentic orientations like goals, values, and planning can predict students' behavior and thus trigger different life trajectories, even with their backgrounds taken into consideration. They observed that such processes begin with students' decision regarding the trade-offs between school and work. Students with agentic orientations like high educational goals would not work for occupational rewards per se, but work for greater investment in school and to keep a well-rounded and achievement-oriented life style to ensure their success. In contrast, youth who are less agentially oriented and thus less successful in school would put more emphasis on workplace learning experience, greater immediate economic reward and higher status among their peers with similar preference. The authors believe that students have different agentic orientations and strategies to balance work-school requirements during high school, which affect subsequent working patterns and educational achievements; students with successful time management strategies would apply it in the following years to achieve their educational goals. Such routing mechanisms of early agency status in personal development is independent from the long-term effect of social status background (Mortimer et al., 2005).

2.4.5 Agency as subject to change in structural constraints

Even though an individual's agency status tends to be relatively stable, it may also change as one moves through the life course. Exercising agency as coping is constrained by social structure (Thoits, 2006). Coping can be case- and situation-specific as the nature of stressors, relationships, and institutional contexts differ from case to case (Pearlin, 1989). Complicated structural settings may both allow and constrain the exercise of agency, affect its effectiveness, and gradually modify the agency.

Structural settings may either enhance or diminish one's resources for possible exercise of agency. That is to say, "people do not usually select themselves purposefully into states of misery and confusion; they are *socially* placed, *socially* channeled, and *socially* shaped, sometimes despite their best efforts to meet and overcome threats and misfortunes" (Thoits, 2006, p. 318). People are located in a certain place in the social structure with a unique combination of age/cohort, race/ethnicity, sex/gender, and social class (education, occupation, income or their combinations) (Settersten & Gannon, 2005). Either ascribed or achieved, these statuses work together as part of social stratification, which affects personal resources and capacities and generates barriers in the social world (Settersten & Gannon, 2005; Shanahan, 2000).

Still, people can exert agency and take advantage of the possibilities to foster and pursue their plans with "bounded strategic action" (Shanahan, 2000), rather than being totally constrained by structural settings. By exercising agency within constraints, individuals can make thoughtful, assertive, and self-controlled choices about their institutional involvements (Shanahan, 2000). Such "bounded strategic action" has offered a possible explanation for why people in similar constraining circumstances will possibly have different outcomes (Shanahan, 2000). However, there is no guarantee that "bounded strategic action" will always work as expected. It is not surprising that the effect of exercising agency and planful competence is not significant when choices are limited.

Given the constraints imposed by structural settings, agency and agentic coping has a dual part in the stress process, as it both regulates the impact of stressors and may be elevated or deteriorated by stress exposures and coping results (Pearlin, Nguyen,

Schieman, & Milkie, 2007; Pearlin & Skaff, 1996). The deterioration of agency can damage health and mental health related outcomes. For instance, a high sense of control may not work for stress buffering, but in fact may harm health and mental health if it is eventually removed, making people particularly vulnerable in case of uncontrollable events, or lead to disappointment and frustration when people can not take advantage of opportunities (Lachman & Weaver, 1998; see also Schulz & Hanusa, 1978; Schulz, 1976; Thompson, Cheek, & Graham, 1988; Wortman, Sheedy, Gluhoski, & Kessler, 1992). In this way, it seems that having a more realistic view of their constraints and opportunities can also be beneficial for individuals in lower social classes (Gurin & Gurin, 1970; Lachman & Weaver, 1998). However, sometimes it is hard to distinguish realism from pessimism, and holding an “overly realistic” view may overestimate difficulties and constraints, just as underestimating one’s potential and resources may hinder agentic actions.

2.4.6 Intertwined structure and agency throughout the life course

As agency continuously affects individuals’ behavior and modifies the structural circumstances and constraints they face, it seems that social structure and agency are intertwined. Using different coping strategies, people simultaneously attempt to confront the problem, adjust their focus and behavior, and control their emotional responses (Thoits, 2006). Agency, especially its personal dimensions such as self-esteem and mastery, can select people into and out of stressful circumstances and therefore continually alter the life-course trajectories (Hatch, 2005; Thoits, 1994). People exert agency and make choices within a specific set of constraints, where their actions change both future agency status and circumstance (McLeod & Pavalko, 2008). In this process, people’s choices and actions are not always direct products of conscious and intentional decisions, but are instead the result of gradual accommodation and compromise between personal aspirations, preferences, circumstances and opportunities (McLeod & Pavalko, 2008). In this way, structural constraints and opportunities are intertwined with human agency and behaviors across the life course and affect physical and mental health. This explains how status in social structure, stress exposure, agency and mental health are maintained, amplified or attenuated in their interaction.

Recent theoretical developments in modeling cumulative processes have paid more attention to the dynamic alliance of structure and agency throughout the life course. One example is Cumulative Inequality Theory (CIT), which is developed from Cumulative Advantage and Disadvantage Theory (CAD). As described by Ferraro & Shippee (2009, p. 334), “cumulative inequality theory specifies that social systems generate inequality, which is manifested over the life course via demographic and developmental processes, and that personal trajectories are shaped by the accumulation of risk, available resources, perceived trajectories, and human agency” (For detailed information about five axioms in CIT, see also Ferraro, Shippee, & Schafer, 2009). While noticing the accumulation of risks and opportunities rooted in social structure, CIT particularly emphasizes the modification of trajectories, especially resource mobilization and major transitions in the face of risk and opportunity, which are motivated by agency (Ferraro et al., 2009; Ferraro & Shippee, 2009). Moreover, in addition to considering the objective accumulation of inequality, CIT also stresses one’s subjective view of position, resource and past experience, suggesting that one’s sense of past and future will modify his or her agency status including motivation and behavior (Carstensen, 2006; Ferraro et al., 2009; Ferraro & Shippee, 2009). In this way, one’s perceived life trajectory can be seen as the result of the long-term interaction between structure and agency, which further predicts subsequent trajectories (Ferraro et al., 2009; Ferraro & Shippee, 2009).

2.4.7 Agency in linked lives: a potential interactive process

As individuals are embedded in networks of linked lives, the development and the exercise of agency can be also interactive and collective. Family members’ life trajectories are closely related. In stressful situations, individuals’ agency and coping strategies affect not only themselves but also their family members’ life trajectories.

It has been discussed earlier that childhood adversities tend to cluster within family circumstances. In addition, one’s stress can also come from other family members. Family serves as the backdrop of risk and resilience in the stress process, including stress exposure, support and coping (McLeod & Almazan, 2003). Besides shared constraints and resources, the bonds between family members serve as a network of support within and between generations, providing a sense of security (Hagestad, 2003). What’s more,

the life trajectories of family members are intertwined, and one's life transitions can easily affect other family member's trajectories as "crossover effects" (Hagestad, 2003; Macmillan & Copher, 2005; Moen & Hernandez, 2009). For example, a husband's experiences of conflict on job would also affect his wife's experience of stress, and even crossover to their children (Moen & Hernandez, 2009).

In this way, in face of stressors, individuals' agency and coping strategies have long-term effects not only on themselves, but also on other family members within the same interpersonal contexts, as stress proliferates between them. Some negative events are avoidable for some individuals if their agency is used actively and properly (Thoits, 2006). But for their relatives, whether these negative events happen or not is beyond their control, while these event may affect their lives. For example, factors crucial to children's development, like family SES, family structure and its stability, are more affected by the status and agency of parents than of the children. As with careers and family relationships, people's level of agency and coping efforts can have a substantial impact on their relatives. Sometimes coping decisions can also be made at the family level, where family members figure out a solution together (Moen & Hernandez, 2009).

In addition to preventing family members from being exposed to stressors, agency and strategic coping can also protect family members in stressful situations. Trying to keep a supportive parent-child interaction in stressful situations can be hard, but might still be possible and rewarding. Research has found that even if the fathers are not residing in the same household or are only considered as a "social father," those who are actively involved in their children's upbringing can provide numerous benefits (Amato, 1994a; Black, Dubowitz, & Starr, 1999; Bzostek, 2008; Carlson & McLanahan, 2006; Smock & Manning, 1997; Waldfogel et al., 2010). What's more, people with greater agency tend to more actively seek emotional and practical support from relatives and friends to solve their problems (Thoits, 2006). Active problem-solving efforts like this may benefit both parent and child.

The development of agency is also a collective process. Children's development of agency is associated with parent's agency level and family environment, as well as their

own life experience and stress exposure. Positive parenting and positive interaction between parents and children are significant factors in the development of children's self-efficacy and a wide range of agency related outcomes (Gecas, 2003). As meaning management serves as a coping strategy, one's perceived meaning is not formed by isolated cognitive manipulation but is instead shaped within living circumstances and social groups, both of which are related to family (Pearlin & Skaff, 1996). In this way, children can develop their agency by observing and learning from their parents.

What's more, people in the same or similar circumstances may share coping behavior and use others as reference figures (Pearlin & Skaff, 1996; Pearlin, 1989). People's agency and social status may also change as a group throughout their life trajectories (Settersten & Gannon, 2005). People's interaction is also agentic, affecting each other's perceptions, expectations, preferences and actions (McLeod & Pavalko, 2008). In this way, interaction between parents and children may further affect children's agency development in an inconspicuous way. For instance, parent's low educational expectations can partly explain the association between children's mental health problems and their educational achievement, since parents' low expectations can be expressed by potential symbolic interactions in parenting and impair children's agency (McLeod & Pavalko, 2008)

2.5 Conceptual model and research questions

Shown as Figure 1, the life course stress process model is designed to examine the connection between adolescent stress exposure and mental health outcomes in adulthood, especially with regard to how support obtained from linked lives and agentic coping affect the connection.

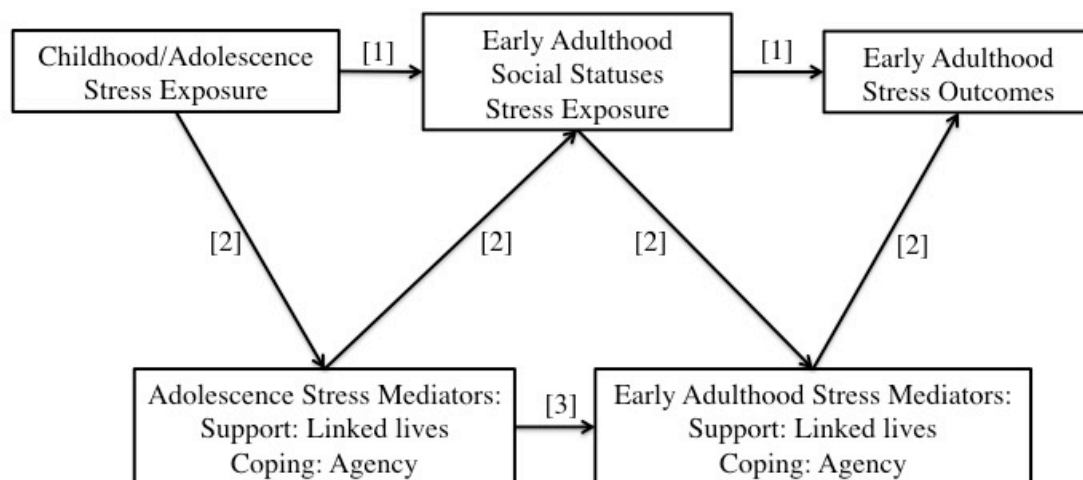


Figure 1: Conceptual Model of the Life Course Stress Process

The life course perspective has been expanding the scope of the stress process paradigm and contributing to research on the association between previous life experience and later stress exposure, and subsequent physical and mental health outcomes. In the model, this connection is presented as Path 1, from adolescent stress exposure to adult living environment, stress exposure and to stress outcome in adulthood. Research on cumulative advantage/disadvantage processes has suggested that longitudinal patterns in stress exposure may follow processes of path dependence, duration dependence and/or joint stressors.

Within these cumulative processes, the concept of “linked lives” has enriched the understanding of stress exposure. Linked lives—that is, interpersonal connections within households—could be sources of both primary and secondary stressors. Sharing a common living environment, family members are likely to be exposed to common stressors, and one family member’s stressful experience can easily affect other members.

The quality of interaction between family members could also be compromised at the same time. Such stress proliferation via linked lives can be observed across people's life course.

Meanwhile, linked lives may also mediate the effect of stress exposure. Support from family members including parents and grandparents can benefit individuals in different ways. They may protect individuals from the consequences of stress exposure, influence one's later social statuses and stress exposure, and even modify one's life trajectory. This is a continuous process throughout the life course, which is presented as part of Path 2 in the model. Still, the availability and quality of support from family members depends on the donor-recipient interaction, which is subject to change as time goes on. The possible continuity and changes in the relationship between family members is also part of Path 3.

In addition, agency as a coping resource also plays a crucial yet largely overlooked mediating role in the stress process following Path 2. In the model, agency is formed within the social structure partly as a result of social causation. At the same time, high levels of agency can buffer the impact of stress and motivate active coping strategies, while ineffective agency would possibly impair the willingness to engage in coping efforts and lead to greater vulnerability to stress. Possible coping efforts include changing the stressful situation, managing the meaning of the situation and controlling of the symptoms of stress. These efforts in turn work as selection processes, which lead to different outcomes in social statuses and mental health. In this way, agency modifies one's life trajectory and plays a role in the cumulative advantage and disadvantage process. Meanwhile, as agency operates within structural constraints as bounded strategic action, it can be further elevated or deteriorated by the coping results and subsequent stress exposure. Therefore, one's social status and agency are intertwined and continuously changing throughout the life course following Path 2. In addition, the effect of adolescent agency development may persist into later life, a possibility considered as part of Path 3.

Considering agency within the linked lives perspective would further develop our conceptualization of both processes. Family members share similar social statuses, offer

emotional and practical support to each other and experience interlocked transitions in their life trajectories. Therefore, one's agentic behavior may protect relatives from being exposed to avoidable stressors, helping them to alleviate the impact of current stressful experiences, and thus affecting their living environment and life trajectories. Also, agency is developed in a collective and interactive manner. People acquire agency partly by observing and learning from others who are in similar circumstances, and their exercise of agency can be affected by their relative's agency, even in an unconscious way. The reciprocal relationship between agency and linked lives therefore suggests that coping and support in the stress process are possibly related.

Following the life course stress process model, this research examines the possible pathways to stress outcomes from an early period of life such as adolescence, with a special focus on the dynamics of stress exposure, coping and social support. This thesis investigates the following research questions: 1) Does stress exposure in adolescence affect mental health status in adulthood? 2) In adulthood, are social statuses and stress exposures associated with mental health in adulthood, mediating the effect of stress exposure in adolescence? 3) Do perceived support and coping resources operate as part of the life course stress process—and if so, how? Can they mediate the possible effect of stress exposure and social statuses on adult mental health? Are agentic coping resources influenced by stress exposures, social statuses and linked lives across the life course? Do adolescent agentic coping resources persist into adulthood?

From these questions and the aforementioned theoretical and empirical literature, the following hypotheses can be derived. Hypothesis 1: mental health status in adulthood can be traced back to early stress exposure in adolescence. Hypothesis 2: adult social statuses and possible stress exposure (economic status, education, marital status, having children) are associated with mental health status in adulthood, possibly as consequences of adolescent stress exposure following a cumulative process. Hypothesis 3: perceived family support and coping resources mediate the effect of stress exposure and social statuses on adult mental health in adolescence and adulthood. Hypothesis 4: agentic coping resources are influenced by stress exposures, social statuses and linked lives in both adolescence and adulthood. Hypothesis 5: agentic coping resources such as self-

esteem possessed in adolescence are associated with self-esteem in young adulthood. Testing these hypotheses will further enhance our understanding of how mental health disparities develop across the life course.

Chapter 3

3 Data and Variables

The present research is based on the Focal Child interviews in the second and the third waves of the National Survey of Families and Households (NSFH), from which the variables are constructed.

3.1 Data

This research is based on data from the National Survey of Families and Households (NSFH) (see Sweet, Bumpass, & Call, 1988), which is a 3-wave longitudinal survey conducted in the United States. Started in 1988, NSFH is a nationally representative probability sample including an original sample of 13,017 Primary Respondents. The sample includes 9,643 households with a double sampling of Blacks, Puerto Ricans, Mexican Americans, single-parent families and families with stepchildren, cohabiting couples and recently married persons. Among the children within a Primary Respondent's household, one "Focal Child" (aged 5-18) was chosen based on which child's name appeared earliest in the alphabet. Primary Respondents answered a series of questions referring to the "Focal Child" at Wave 1 (1988-1990). Later, the "Focal Child" was interviewed directly by telephone in Wave 2 (1992-1994), when s/he was between the age of 10 and 23, and again in Wave 3 (2000-2002) when s/he was between the age of 18 and 34.

NSFH has detailed records on children's interaction with their parents and grandparents, especially from the child's perspective at Wave 2 and Wave 3. It also offers good information on children's agency and general family environment. To trace the pathways to adulthood stress outcomes from adolescent life experiences, current research is based on a sub-sample of Focal Children who had not entered adulthood at Wave 2, ranging in age from 10-17 ($N=1,415$). These children were followed into Wave 3, 8 years later as young adults aged 18 and above ($N=868$). The overall response rate for Focal Children at Wave 2 was 48%, and the response rate at Wave 3 for those who completed a Wave 2 interview was 61% (Wright, 2003). In addition, Wave 1 Main Respondent data was used

Table 1: Descriptive Statistics (N = 868)

Variable	Obs	Obs/N	Min	Max	Alpha
Adolescent Stress Exposure (Wave 2)					
Adolescent exposure to economic strain (Ref=not exposed)	638	73.50%			
Exposed = 1	212	24.42%			
Family instability experience before 18 (Ref=stable)	434	50.00%			
Experienced = 1	434	50.00%			
Demographic Control Variables					
Age (In adolescence/Wave 2)	868	100.00%	10.00	17.00	
Gender: (Ref=female)	469	54.03%			
Male = 1	399	45.97%			
Race/ethnicity (Ref=White)	682	78.57%			
Other = 1	184	21.20%			
Adolescent Family Support (Wave 2)					
Adolescent family atmosphere (Factor by PCA)	823	94.82%	-1.23	3.69	0.70
Adolescent perceived support from parent (Factor by PCA)	833	95.97%	-4.73	1.23	0.72
Adolescent perceived support from grandparent (Factor by PCA)	826	95.16%	-3.75	1.63	0.69
Adolescent Coping Resource (Wave 2)					
Adolescent self-esteem (Factor by PCA)	846	97.50%	-2	3.03	0.55
Adult Stress Exposure/Social Statuses (Wave 3)					
Adult exposure to economic strain (Ref=not exposed)	600	69.12%			
Exposed = 1	194	22.35%			
Education (Ref=some college)	205	23.62%			
Four year college/university = 2	268	30.88%			
Master and above = 3	315	36.29%			
Marital Status (Ref=single)	314	36.18%			
Single with stable relationship = 2	264	30.41%			
Cohabiting = 3	136	15.67%			
Married = 4	154	17.74%			
Have any children (Ref=no child)	685	78.92%			
Have children = 1	183	21.08%			
Adult Family Support (Wave 3)					
Adult perceived support from parent (Factor by PCA)	867	99.88%	-5.07	1.15	0.71
Adult perceived support from grandparent (Factor by PCA)	663	76.38%	-2.84	2.13	0.69
Adult Coping Resource (Wave 3)					
Adult self-esteem (Factor by PCA)	863	99.42%	-1.59	4.72	0.65
Adult Stress Outcomes (Wave 3)					
Adult distress affect (From CES-D) (Factor by PCA)	862	99.30%	-0.77	4.68	0.85

as demographic and control variables. Data from these three waves of NSFH were merged by case ID, resulting in a sample of 868 cases for imputation.

After the imputation, cases having no available grandparents in adolescence (at Wave 2) and having imputed dependent variables are deleted. In this way, the sample for the first set of models on adult distress affect consists 830 Focal Children, and the sample for the second set of models on adult self-esteem consists 828 Focal Children. Characteristics of the sample and descriptive statistics of the variables are listed in Table 1. Less than half of the sample is male, with about 13 years of age on average at Wave 2 (SD=2.24), and

78.57% of the sample is White. About one quarter of the sample experienced economic strain in adolescence, and half of the cases had experienced some kind of family instability before reaching age 18. The variable factors generated by Principal Component Analysis are standardized, with mean values equal to 0 and standard deviations equal to 1. Details of these variables are presented in the rest of this chapter.

3.2 Variables

The construction of both the dependent and independent variables used in the analysis is discussed below. Supporting information related to key variables and scales, including the original survey questions, is presented in Appendix A.

3.2.1 Stress outcomes: Focal Child's depressed affect in early adulthood

Focal Child's depressed affect is the dependent variable in the first set of models in the present research. At Wave 3, children's psychological distress was measured by a subset of 10 items from the Center for Epidemiologic Studies-Depression Scale (CES-D) (Radloff, 1977). This is a self-report of how many days the respondent had depressive experiences in the past week (0-7). The original CES-D scale consists of 20 items, and Principal Component Analysis (PCA) is widely used to identify different factors in the 20-item scale, including depressed affect (*blues; depressed; lonely; cry; sad*), positive affect: (*good, hopeful, happy, enjoy*), somatic and retarded activity (*bothered, appetite, effort, sleep, get going*) and interpersonal (*unfriendly, dislike*) (Radloff, 1977; Shafer, 2006; Shean & Baldwin, 2012). Radloff (1977) suggested that the items are all symptoms related to depression and a total score is recommended as an estimate of the degree of depressive symptomatology, as these four factors explain a total of 48% of the variance. The CES-D scale may also be considered as a measure of non-specific psychological distress and rather than depression only (Orme, Reis, & Herz, 1986).

Efforts are also made to shorten the scale and possible solutions have been tested (Boey, 1999; Kohout, Berkman, Evans, & Cornoni-huntley, 1993; Lee & Chokkanathan, 2008; Levine, 2013; Schroevers, Sanderma, Van Sonderen, & Ranchor, 2000). It is possible that the 4 factors discussed above can also be identified in shortened forms of CES-D

(e.g. Kohout et al., 1993). For the 10-items scale (CESD-10) developed by Andresen and colleagues (1994), only two out of four factors can be identified, including depressed affect and positive affect, and most of the attention has been put on the depressed affect when applying shortened forms of the CES-D scale (Boey, 1999; Lee & Chokkanathan, 2008). When using NSFH for a different analytical sample, Ruiz and Silverstein (2007) selected three items (*depressed, sad, lonely*) from the 10-items CES-D to indicate depressed mood, and used principal components analysis to calculate a factor score representing the severity of depressive symptoms.

In this research, 10 out of the 20 items of the CES-D scale are included in the Focal Child interview at wave 3 of NSFH. The items are not the same as those selected by Andresen and colleagues (1994). Based on the present analytical sample consisting of Focal Children, Principal Component Analysis with orthogonal varimax rotation has revealed two factors. The first factor can explain 41.16% of the variance, while the second factor explains an additional 10.90% of the variance. When it comes to the pattern of loadings, with a cut point of 0.40, four items are identified in the first factor, including *lonely, blues, depressed and sad* (for a more detailed description of the items, see Appendix A). Consistent with the interpretations suggested by Radloff (1977), the first factor clearly represents the depressed affect. At the same time, the second factor is describing the somatic and retarded activity, including *bother, mind, appetite, effort, sleep, and get going*. The depressed affect explains much more of the variance than the somatic and retarded activity in the present research.

In order to give a clearer interpretation, the present research will focus on depressive and negative affect, while other dimensions of psychological distress are compromised, representing a potential limitation of this research. The four measurements on depressive affect are reliable with an alpha value equal to 0.85. Rather than assuming they are equally weighted and summing them up, PCA weights the items based on the eigenvectors and calculates a standardized linear additive factor score, which approximates the level of depressed affect as a continuous variable. For the four items, Principal Component Analysis with orthogonal varimax rotation has revealed one eligible factor, with an eigenvalue equals 2.79 and explaining 69.81% of the variation. For this

variable, a higher score indicates a higher level of depressive affect. If any one of the four items is missing in a case, the score is defined as missing.

3.2.2 Early stress exposure: Focal Child's exposure to economic strain in adolescence

In the current research, the Focal Child's early stress exposure in adolescence is measured in relation to experiences of economic strain and family instability. Both of these serve as independent variables in the life course stress process model.

The Focal Child's experience of economic strain in adolescence is assessed by a measure indicating whether the child grew up in a low-income family or not. At Wave 2, data collectors calculated total household income as the "Best Income Measurement" based on multiple information sources. Based on this estimated household income measure, the Focal Child's family economic status is represented by an index, which is calculated by dividing total household income by the federal poverty line for corresponding household size. Some children who lived with the "Main Respondent" at Wave 1 no longer live in the same household at Wave 2 (83 out of 868). For these individuals, current economic status was measured by the Main Respondents' household income index at Wave 2. Children whose family economic status index falls below the 25th percentile are defined as having grown up in a low-income family during adolescence and coded as 1. Other cases become the reference group and are coded as 0.

3.2.3 Early stress exposure: Focal Child's experience of family instability before 18

Another possible stressor in adolescence is family instability. At Wave 3, the Focal Child was asked if there was ever a period of four months or more during their childhood (from birth to age 18, or until they left home) when they were not living with their biological parents. Possible reasons for separation include having never lived with mother/father, parents' separation or divorce, parent's death or illness and other situations. If a Focal Child has experienced a separation with either their biological father or mother, s/he is considered to have experienced some kind of family instability and coded as 1. Otherwise, the Focal Child is considered to have grown up in an intact family, which serves as the

reference group and is coded 0. Because there is not enough information to construct a full trajectory family experience before the age of 18, a binary variable indicating whether the Focal Child grew up in an intact family serves as the best available proxy.

3.2.4 Social statuses and stress exposure in young adulthood: Focal Child's personal income status

As suggested by the life course stress process model, social status and stress exposure in young adulthood may mediate the association between previous stress exposure and stress outcomes in young adulthood. In the current research, Focal Child's social status and stress exposure in young adulthood is represented by four measures: personal income status, educational accomplishment, relationship status, and parenthood status.

As children transition into young adulthood, research also moves beyond indicators of the household of origin to incorporate additional indicators that capture individual social economic status. In this research the Focal Child's personal income status in young adulthood (at Wave 3) was measured from three aspects, including salary income, welfare income and other sources of income. Total personal income was calculated by summing income from different sources, and is defined as "missing" if any component is missing. Focal children whose personal income falls below the 25th percentile are defined as having low personal income (coded as 1). The reference group consists of Focal Children whose personal income is above the 25th percentile (coded as 0).

3.2.5 Social statuses and stress exposure in young adulthood: Focal Child's educational attainment

Educational attainment is a key factor in personal development. To capture educational attainment, at Wave 3 focal children were asked how much education they will eventually complete. If the child had already completed the reported level of education, this final educational level was recorded. Individuals who planned to or had already completed high school, vocational or trade school, two-year/junior/community college, and one to three years of colleges are recoded as 1. Graduating from a four-year college or university is recoded as 2, and completing a Master's, Doctoral, or other professional degree is recoded as 3.

3.2.6 Social statuses and stress exposure in young adulthood: Focal Child's relationship status

Getting married or starting a relationship can be a major transition in one's life course, which may have psychological effects. Marriage or stable relationships can be supportive in stressful situations, while experiencing relationship instability and crisis can be stressful. To represent Focal Child's marital and relationship status in early adulthood, a variable is created where 1= "single without a stable relationship," 2= "single within a stable relationship," 3="currently cohabiting," and 4= "currently married." "Single without a stable relationship" is the reference category for this variable.

3.2.7 Social statuses and stress exposure in young adulthood: Focal Child's parenthood status

Becoming a parent is another major transition in one's life course, and raising a child can be demanding, both financially and emotionally. Focal Children with one or more children are coded as 1, while those with no children are coded as 0 and serve as the reference group.

3.2.8 Coping resource: Focal Child's self-esteem in adolescence and young adulthood

An individual's coping resources are affected by stress exposure in adolescence and young adulthood, as well as serve as protection against the harmful effects of stress. In the present research, coping resources are captured by measures of self-esteem.

Self-esteem serves as a dynamic coping resource throughout the life course. In the NSFH, self-esteem level is measured in three dimensions from the Rosenberg self-esteem scale, measured at Wave 2 and Wave 3 (Rosenberg, 1965). In both waves the Focal Child was asked about the extent to which s/he agrees with statements such as "I am a person of worth," "I do things as well as others," and "I am satisfied with myself." The answers were based on a 4-point scale (Wave2) or a 5-point scale (Wave 3) ranging from 1="Strongly Disagree" to 4/5="Strongly Agree" (reverse coding is applied when necessary in present research).

Based on these three dimensions, Principal Component Analysis (PCA) with orthogonal varimax rotation has identified one eligible factor to represent the Focal Child's self-esteem level, whose eigenvalue equals 1.57 and explaining 52.58% of the variation. Using the result from PCA, a linear additive factor score is calculated to represent one's self-esteem level in both Waves 2 and 3 (see, Ruiz & Silverstein, 2007; Silverstein & Ruiz, 2006). A higher value indicates a higher self-esteem level. This indicators, based on the three items, has an $\alpha=0.54$ when the Focal Child was an adolescent (Wave 2), and an $\alpha=0.65$ when the Focal Child was a young adult (Wave 3). Note that the alpha value is less than ideal at Wave 2, possibly due to the relatively small sample size (846 out of 868) and a small number of dimensions. It is also possible that people may react differently to the Rosenberg self-esteem scale as they move from adolescence to young adulthood. In this case, using PCA to identify the major component for each age group and create a weighted factor score may better describe the self-esteem level at the time, compared with simply adding up the items.

3.2.9 Perceived support in adolescence and young adulthood: support from parents/parental figures

An individual's perceived support is also affected by stress exposure in adolescence and young adulthood, while serving as protection against the harmful effects of stress. In this research, the measures of perceived support include support from a parent, a grandparent, as well as experiencing a supportive family atmosphere.

Interaction with parents or parental figures can serve as a critical source of support when facing stressors in adolescence and young adulthood. For adolescents at Wave 2, relationship with parental figures (including parent(s), step-parent, parent's partner) that live in the same household are taken into consideration. When the Focal Child matures to young adulthood at Wave 3, relationship with parents and step-parents are considered regardless of whether they live with the Focal Child or not. Three aspects of the Focal Children's support from parental figures are captured in this analysis, including their general relationship and the receipt of emotional and instructive support.

First, the Focal Child's "general relationship" with his/her parent is measured by asking generally how the child would describe the relationship with the paternal and maternal figures. The answers are coded on a scale from 0 to 10, where 0 is "really bad" and 10 is "absolutely perfect". The highest value is used as an indicator of the Focal Child's best overall relationship with a parental figure in the household. The Focal Child's access to parental emotional support is measured by how likely the Focal Child would talk to the parent when s/he feels depressed or unhappy. The responses range from "1: definitely would not" to "5: definitely would." The highest value articulated by the Focal Child is used to represent the best parental emotional support available for the Focal Child. The availability of instructive support is measured by asking how likely the Focal Child would be to talk with his/her parent when s/he has a major decision to make. The five-item scale ranges from "1: definitely would not" to "5: definitely would." The highest value from parental figures is used to represent the parent's level of instructive support for the Focal Child.

Based on these three aspects, indices for parental support experienced in adolescence and adulthood are constructed using PCA. For the parental support in adolescence, PCA with orthogonal varimax rotation has identified one eligible factor, whose eigenvalue equals 2.14, explaining 71.4% of the observed variation. Similarly, when it comes to parental support in young adulthood, one eligible factor is identified as well with eigenvalue equals 2.03, explaining 67.74% of the variation. Rather than focusing on a specific parent, the index describes the overall status of parental support available for a Focal Child. The indices capturing parental support experienced by adolescents and young adults have alpha values of 0.75 and 0.71, respectively.

3.2.10 Perceived support in adolescence and young adulthood: support from grandparents

Support from grandparents may play a unique role in stressful situations. In the present research, three dimensions represent the grandparent support, including a child's general relationship with a grandparent, how often a child has contacted a grandparent in the past year, and the emotional/instructive support a child received from a grandparent. Instead of focusing on a specific grandparent, this research will consider the Focal Child's

grandparents as a whole and assess the best possible support that grandparents can offer collectively (see, Ruiz & Silverstein, 2007; Silverstein & Ruiz, 2006).

Information about both maternal and paternal grandmothers/grandfathers is taken into consideration at Wave 2, while Wave 3 further adds grandmothers/grandfathers on the step-parent's side. The total number of available grandparents for a Focal Child is calculated. If a grandparent was dead or the child does not know the status of a grandparent, this grandparent is defined as not available to the child. If a Focal Child reported no available grandparent in adolescence (at Wave 2), the total number of grandparents is defined as 0 for this case.

At Wave 2, the Focal Child was asked to describe his or her general relationship with grandparents, including maternal grandmother, maternal grandfather, paternal grandmother and paternal grandfather. The relationship was evaluated based on a scale ranging from 0 to 10, where 0 means not at all close and 10 represents extremely close. At Wave 3, the relationship with step grandmother and/or step grandfather was also taken into consideration. If a Focal Child had no connection with any grandparent, the general relationship was defined as 0. For both waves, the highest value (indicating the closest relationship with available grandparents) was used as an indicator of grandparent-child interaction.

The contact frequency with grandparents in the last year was assessed by asking how often the Focal Child talked on the telephone or received a letter from the grandparent(s). Possible responses included "1: not at all; 2: about once a year; 3: several times a year; 4: 1-3 times a month; 5: about once a week; 6: several times a week; and 7: grandparent lives with respondent." If a Focal Child had no available grandparent, the value was set to 1 (not at all). The highest contact frequency across all of the grandparents was used to describe the best available level of grandparent-grandchild interaction.

The emotional support that a Focal Child received from grandparents was measured by how likely the child was to talk to a grandparent when facing a major decision or feeling depressed or unhappy. Possible answers ranged from "1: definitely would not" to "5: definitely would."

As mentioned previously, Focal Children who did not have any available grandparent during adolescence are excluded from the analysis after the imputation of missing data, because there is not sufficient information on the relationship between grandparents and grandchildren prior to the Wave 2 interview.

A composite measurement was constructed based on the three dimensions discussed above using Principal Components Analysis at each wave. At Wave 2, one eligible factor is identified to represent the Focal Child's relationship with grandparents, where the eigenvalue equals 1.93, explaining 64% of the variation. In Focal Children's early adulthood (Wave 3), one eligible factor is revealed with an eigenvalue equal to 2.3, explaining 76.91% of the variation. These measures describe the overall support level from grandparents as a group, rather than focusing on a specific grandparent. For most cases, the three dimensions refer to the same grandparent (see, Dunifon & Bajracharya, 2012; Ruiz & Silverstein, 2007). The three aspects describing the child's perceived support from grandparent are reliable with an $\alpha=0.69$ at Wave 2 during adolescence, and an $\alpha=0.75$ at Wave 3 in young adulthood.

3.2.11 Perceived support in adolescence: The family atmosphere

Family atmosphere can be an indicator of the supportiveness of the linked lives. A warm and supportive family atmosphere can be valuable for children when they are exposed to stressors including economic strain and family instability. Conversely, a stressful family atmosphere can be affected by each family member's stress exposure and as primary or secondary source of stressors. The family atmosphere is a general description of the perceived family support, in addition to the specific support from parents and grandparents. In the present research, family atmosphere is evaluated based on the Focal Child's response the following statements ranging from "1: not at all true" to "4: very true." Statements include: "the family has fun together," "things are tense and stressful in the family," "family members show concern and love for each other," "family members feel distant and apart from each other," and "Our family works well as a team." Some items were reverse coded for consistency so that a higher number indicates a better family atmosphere. Principal Component Analysis of these five items with orthogonal varimax rotation identifies one eligible factor, which has an eigenvalue equal to 2.31 and

explains 46.31% of the variation. It further gives a standardized composite measurement of family atmosphere. These five items are reliable at $\alpha = 0.70$.

3.2.12 Demographical control variables: Focal Child's age, gender and race/ethnicity

Data on the Focal Child's age and gender were collected at Wave 2. Even though Focal Children can be defined as members of the same birth cohort, adolescence and young adulthood can be periods of significant life changes, such as advancing through the educational system and joining the workforce. A few years' difference in age can mean significant diversities in life experiences and maturity during adolescence and young adulthood, so it is necessary to control for age. Gender was controlled (male = 1) because gender differences in the development of mental health and self-esteem is well documented in the literature (e.g. Bolognini, Plancherel, Bettschart, & Halfon, 1996; Cauce et al., 2000; Rosenfield & Mouzon, 2012; Seedat et al., 2009). The Focal Child's race/ethnicity was inferred from the race/ethnicity of the Main Respondent. Non-Hispanic White (coded 0) serves as the reference group, while other races/ethnic groups were coded 1. Racial/ethnic identity was controlled because it could be associated with one's social status and development, or with certain patterns of interaction and support between family members (especially potential race/ethnic differences in parenting style and multi-generational supports (e.g. Hirsch, Mickus, & Boerger, 2002)).

3.3 Handling the missing data: MICE

In the present research, missing data is addressed by using Multiple Imputation by Chained Equations (MICE). MICE is one of the technical solutions in Multiple Imputation (MI), which is gaining in popularity thanks to its generality and recent computing developments (White, Royston, & Wood, 2011). Using MICE in the present research is plausible considering the structure of the missing values. Meanwhile, the MAR assumption in MICE is satisfied in the present research as long as the imputation and estimation model of MICE is based on solid theoretical background with a broad selection of relevant variables. For more detailed information regarding the imputation process in the present research, please refer to Appendix B.

When it comes to sample weight, NSFH is designed to be a national probability sample representing the population in the United States (Sweet, Bumpass, & Call, 1988). To better achieve this goal some important subgroups were oversampled, including racial/ethnic minorities, one-parent families and families with step-children, cohabiters and recently married persons (Sweet et al., 1988). At Wave 3, all the Focal Children were contacted regardless of whether they had participated wave 2 or not. However, there is no special sample weight calculated for the Focal Children interviewed in both Wave 2 and Wave 3. With regard to this problem, it is possible that if the variables related to oversampling are included in the imputation model, the weight is not likely to add more information to the model (Methodology Center PSU, n.d.). A test has been conducted by regressing the survey weight on the variables in the model using ordinary linear regression, where R-square equals 0.2, suggesting that the information of the weight has been already taken into consideration in the imputation model (Methodology Center PSU, n.d.).

Chapter 4

4 Analytic strategies and results

The present research explores possible pathways to stress outcomes beginning in adolescence, especially the dynamics of stress exposure, coping and social support. To accomplish this goal, a life course stress process model has been constructed based on previous research and tested using the NSFH. The analytical sample consists of 868 Focal Children aged 10-17 in Wave 2, of which 399 (45.97%) are males and 184 (21.2%) are non-white (see Table 1). The average age at the time of interview (at Wave 2) was 13.25 years old. About a quarter of the sample experienced economic strain in adolescence, and half of the cases had experienced some kind of family instability before reaching age 18.

The results to follow address the following research questions: 1) Do the experiences of economic strain and family instability in adolescence affect depressed affect in adulthood? 2) In adulthood, are social statuses and stress exposure associated with depressed affect, mediating the effect of experiencing economic strain and family instability earlier in life? 3) Do family support and self-esteem operate as part of the life course stress process—and if so, how? Can family support and self-esteem mediate the possible effect of stress exposure and social statuses on adult mental health? Is self-esteem affected by stress exposures, social status and family support in both adolescence and adulthood? Does the effect of self-esteem persist into adulthood?

Based on these research questions, this research tests the following hypotheses using multiple regression models. Hypothesis 1: depressed affect in adulthood can be traced back to the exposure to economic strain and family instability in adolescence. Hypothesis 2: adult social statuses and stress exposure are associated with depressed affect in adulthood, possibly as a consequence of adolescent exposure to economic strain and family instability following a cumulative process. Hypothesis 3: In adolescence and young adulthood, perceived family support and self-esteem mediate the effects of stress exposure and social statuses on adulthood depressed affect. Hypothesis 4: stress exposure,

social status and family support affect self-esteem in both adolescence and adulthood.
Hypothesis 5: self-esteem levels in adolescence persist into adulthood.

4.1 Pathways to depressed affect in young adulthood

To address the research questions and test the above hypotheses, multiple regression models based on OLS have been designed according to the life course stress process model. The analytic structure describing the pathways to depressed affect in young adulthood is presented in Figure 2.

As indicated by Path 1 of Figure 2, Model 1 is designed to check if psychological distress in adulthood can be traced back to stress exposure in adolescence, including economic strain and family instability. In Model 1, Focal Child's age, gender and race/ethnicity are controlled.

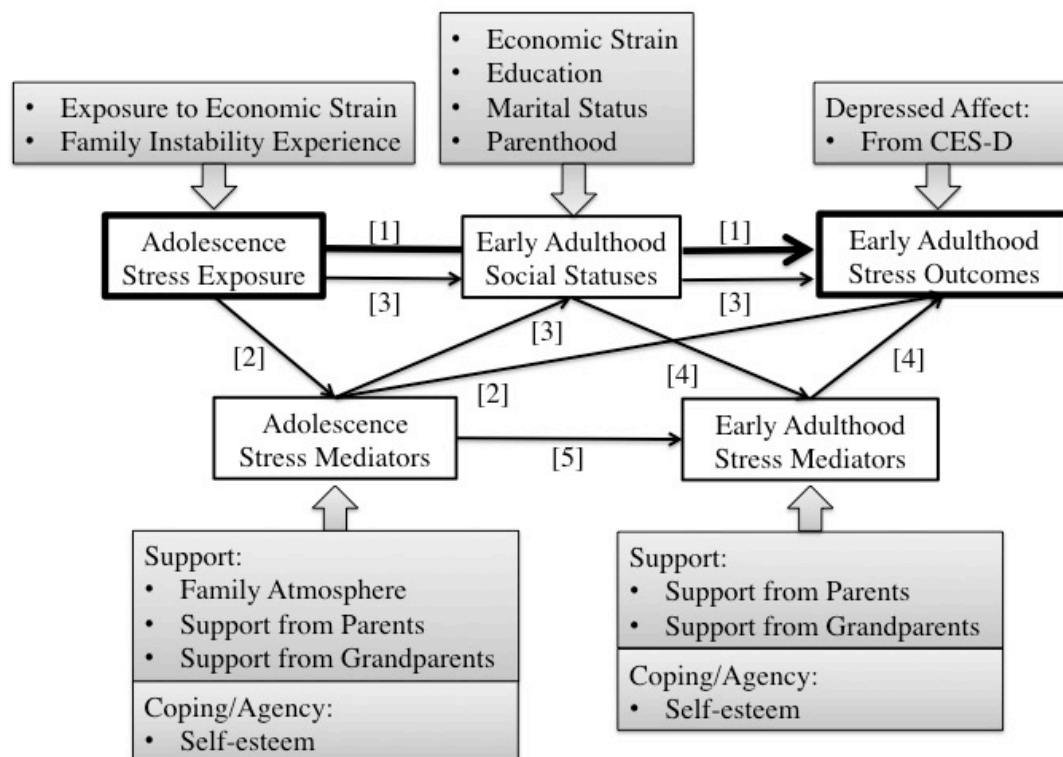


Figure 2: Analytic structure of the pathways to adult depressed affect

At the same time, there is possible long-term reciprocal relationship between stress exposures in living environment and stress mediators, which operates as a possible cumulative process following Paths 2, 3, and 4 of Figure 2. As suggested by Hypothesis 3, perceived support from family in adolescence, as well as self-esteem, may mediate and/or moderate the effect of stress exposure and social status on depressed affect in adulthood. This is depicted as Path 2 in Figure 2. In this way, Model 2 introduces perceived family support and self-esteem in adolescence to test their mediating effect.

As mentioned in Hypothesis 2, adult social statuses are possible results of the interaction between stress exposure and stress mediators during adolescence. Adult social statuses may also affect one's depressed affect, so they are possible mediators in the cumulative process. Following Path 3 of Figure 2, the mediating effect of social status and related stress exposure in young adulthood is tested in Model 3.

In addition, Model 4 takes perceived support and self-esteem in young adulthood into account. According to Hypothesis 3, these variables may mediate the effects of stress exposure and living environment in adulthood (see Path 4, Figure 2). Also, these possible stress mediators in adulthood may be traced back to their roots in adolescence (see Path 5). In this way, Model 4 presents the full life course stress process model.

In order to more accurately examine the effect of perceived support from grandparents, Focal Children who had no available grandparents in adolescence were excluded from the analysis. Additionally, in order to satisfy the prerequisites of MICE, cases with missing values on the dependent variable (depressed affect in adulthood) were also excluded, reducing the analytical sample to 830 cases. Since the sample size is not large, situations of marginal significant ($p < 0.1$) are also considered with caution. The results of these models are presented in Table 2.

**Table 2: Unstandardized regression coefficients from MICE estimate (OLS)
predicting depressed affect in adulthood**

Independent Variables	Model 1	Model 2	Model 3	Model 4
Adolescent Stress Exposure (Wave 2)				
Adolescent exposure to economic strain (Ref=not exposed)	0.111	0.098	0.071	0.069
Family instability experience before 18 (Ref=stable)	-0.007	-0.039	-0.005	0.022
Demographic Control Variables				
Age (In adolescence/Wave 2)	-0.006	-0.012	0.019	0.021
Gender (Ref=female)	-0.145 *	-0.153 *	-0.194 **	-0.239 **
Other race/ethnicity (Ref=white)	0.225 *	0.222 *	0.135	0.143
Adolescent Family Support (Wave 2)				
Adolescent family atmosphere		-0.077 #	-0.060	-0.047
Adolescent perceived support from parent		-0.041	-0.040	-0.025
Adolescent perceived support from grandparent		0.099 *	0.083 #	0.114 *
Adolescent Coping Resource (Wave 2)				
Adolescent self-esteem		0.003	0.017	0.043
Adult Stress Exposure/Social Statuses (Wave 3)				
Adult exposure to economic strain (Ref=not exposed)			0.154 #	0.147 #
Education: Four year college/university (Ref=some college)			-0.119	-0.105
Education: Master and above (Ref=some college)			-0.173 #	-0.102
Marital Status: Single with stable relationship (Ref=single)			-0.104	-0.086
Marital Status: Cohabiting (Ref=single)			-0.254 *	-0.250 *
Marital Status: Married (Ref=single)			-0.551 ***	-0.474 ***
Have children (Ref=no child)			0.120	0.075
Adult Family Support (Wave 3)				
Adult perceived support from parent				-0.084 *
Adult perceived support from grandparent				-0.065
Adult Coping Resource (Wave 3)				
Adult self-esteem				-0.165 ***
Constant	0.078	0.162	0.002	-0.054
R-square	0.018	0.031	0.065	0.103
Adj R-square (Based on Fisher's z transformation)	0.013	0.021	0.046	0.082

*** $p < .001$; ** $p < .01$; * $p < .05$; # $p < 0.1$.

4.1.1 Model 1: possible long-term effect of adolescent stress exposure on adult depressed affect

Controlling the Focal Child's age, gender and race/ethnicity, Model 1 is intended to test the association between depressed affect in young adulthood and stress exposure in adolescence, such as economic strain and family instability experiences in adolescence, in Path 1. In contrast to Hypothesis 1, results of Model 1 show that these associations are not statistically significant. Meanwhile, the controls for gender and race/ethnicity show that among young adults, females and non-whites tend to have higher level of depressed affect than their male and white counterparts.

4.1.2 Model 2: the mediating effect of perceived support and self-esteem in adolescence

Hypotheses 3 predicted that perceived support from family as well as self-esteem mediate the effects of stress exposure and social status on adult depressed affect. This relationship is represented by Path 2 in Figure 2. Model 2 examines mediating factors in adolescence, such as family atmosphere, perceived support from parents and grandparents, as well as self-esteem.

Since the association between depressed affect in young adulthood and stress exposure in adolescence is not significant in the previous model, the mediating effect of family support and self-esteem is not observed. Even so, result shows that among the possible mediators, perceived support from grandparents is significantly associated with depressed affect in young adulthood. However, more support from grandparents in adolescence predicts higher depressed affect in young adulthood when family atmosphere and parental support are considered. This relationship is contrary to initial expectations, as previous research has suggested that support from grandparents is usually protective against the harmful effects of stressors. The association between support from grandparents and depressed affect in young adulthood observed in the present research may be spurious and caused by other unobserved factors or underlying mechanisms in the support from grandparents. Additional models examining a possible suppressor effect of Focal Child's self-esteem and parental support were also tested. The effect of support from grandparents remained the same and therefore these models were not presented in the final tables.

The effect of family atmosphere is marginally significant (at $p < 0.1$ level), suggesting that a more supportive family atmosphere contributes to lower levels of depressed affect in adulthood. But the mediating effect of parental support and self-esteem in adolescence are not significant, while the results for other variables are consistent with the previous model.

4.1.3 Model 3: mediating effect of social status and stress exposure in young adulthood

Hypothesis 2 predicts that social status and stress exposure in adulthood are associated with depressed affect, possibly as a consequence of exposure to economic strain and family instability in adolescence following a cumulative process (presented as Path 3 in the conceptual model). To examine this hypothesis, Model 3 traces the Focal Child's living environment and social statuses into young adulthood, including exposure to economic strain, educational achievement or aspiration, intimate relationship status and whether or not they themselves have any children.

Results generally support hypothesis 2. Adulthood exposure to economic strain was marginally related with higher levels of depressed affect, while having a Master's level education or higher is marginally associated with lower levels of depressed affect (both at $p < 0.1$ level). Also, cohabitation or marriage is significantly associated with lower levels of depressed affect, even though possible transitions into and out the relationship are not considered in the present research due to data limitations. One possible explanation for the relationship between cohabitation/marriage and lower levels of depressed affect is that an intimate relationship may bring potential economic and emotional benefits, like sharing living expenses and giving emotional support to each other.

At the same time, the positive effect of a supportive family atmosphere in adolescence on the levels of depressed affect in adulthood (which was marginally significant) disappears after social status in young adulthood is incorporated into the model. It is possible that a supportive family atmosphere in adolescence would bring in more advantaged statuses as one moves into young adulthood, lowering depressed affect. Similarly, the race/ethnic difference in young adulthood depressed affect observed in previous models is also no longer significant. Non-whites had higher average levels of depressed affect, a relationship that is possibly explained by disadvantages in living environment and social statuses in adulthood.

4.1.4 Model 4: mediating effect of perceived support and self-esteem in young adulthood

Hypothesis 3 predicts that in adolescence and young adulthood, one's perceived support from family as well as one's self-esteem mediates the harmful effects of stress exposure and social statuses on one's depressed affect in adulthood. In order to test this hypothesis (indicated by Path 4 in Figure 2), Model 4 includes perceived support from parents and grandparents as well as self-esteem in adulthood.

Results from Model 4 partly support Hypothesis 3. In early adulthood, perceived support from parents and grandparents, as well as levels of self-esteem, do not mediate the association between social status and depressed affect that was observed in Model 3. An exception is the association between having a Master's degree or higher and lower levels of depressed affect. This relationship, which is marginally significant in Model 3, disappears in Model 4. One possible explanation is that the benefit of higher educational attainment may be expressed through higher levels of self-esteem and parental support. High educational attainment promotes the development of self-esteem and enhances parental support. It is also possible that high educational attainment is an outcome of strong perceived support from parents and high self-esteem.

Additionally, perceived support from parents and level of self-esteem in early adulthood were also directly related to the level of depressed affect at the time. Having more parental support was significantly associated with lower levels of depressed affect. In addition, higher levels of self-esteem in young adulthood were significantly associated with lower levels of depressed affect. But the connection between stress mediators in adolescence and young adulthood is not clear, since the mediating effect of parental support and self-esteem in adolescence was not significant (as discussed in model 2).

4.2 Pathways of self-esteem in young adulthood

Previous models have examined hypotheses addressing the pathways to depressed affect in young adulthood, and results show that self-esteem in adulthood is significantly associated with levels of depressed affect. Meanwhile, the process of self-esteem development is a crucial part of the life course stress process model. More research is

necessary on the development of self-esteem, and how this process may influence depressed affect and other measures of psychological distress later in life.

As indicated by the life course stress process model, stress exposure and the development of coping resources (as an indicator of agency) are intertwined and reciprocal in nature. One's agency, captured through concepts such as self-esteem, not only mediates the effects of stressors and social statuses, but also is continuously affected by them across the life course. As indicated in Hypothesis 4, stress exposure, social status and family support affect self-esteem throughout the life course, while family support can also mediate the harmful effects of stress exposures and social status on self-esteem. Additionally, Hypothesis 5 suggests that self-esteem levels in adolescence persist into adulthood. In other words, individual agency, operating through levels of self-esteem, can be affected by its development earlier in one's life. The development of self-esteem is presented as Figure 3 as part of the life course stress process.

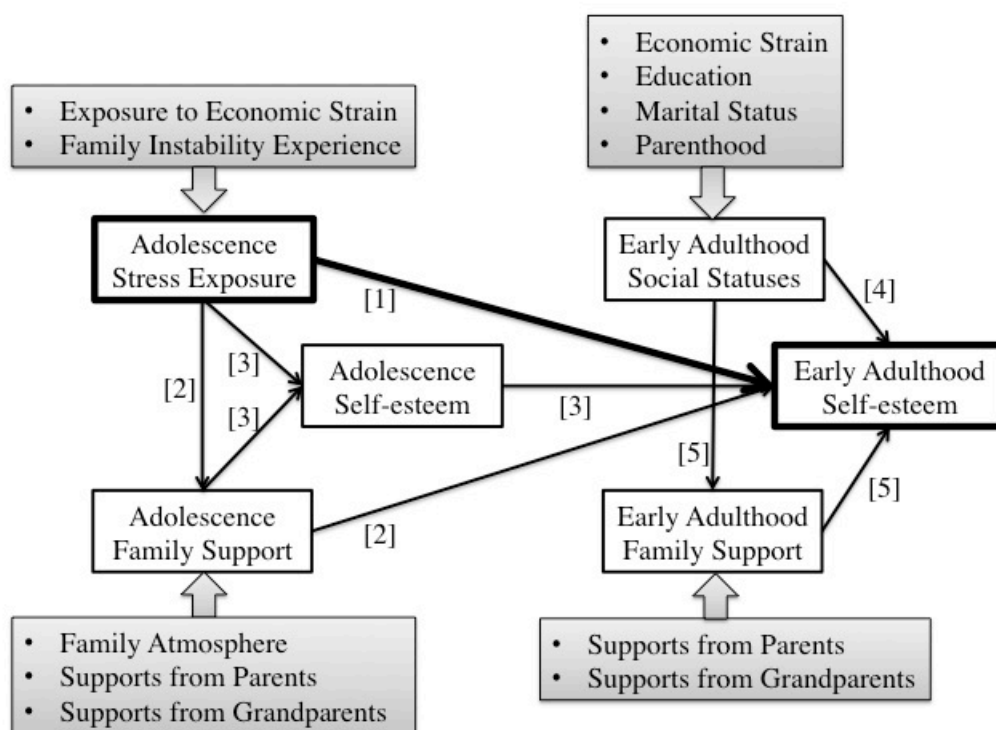


Figure 3: Analytic structure of the pathways to adult self-esteem

In order to test the above hypotheses, multiple regression models based on OLS have been designed. Based on Hypothesis 4, Model 1 examines the long-term effect of adolescent stress exposures on self-esteem levels in young adulthood, following the Path 1 of Figure 3. Stress exposures include economic strain and family instability experienced in adolescence. At the same time, Focal Child's age, gender and race/ethnicity are controlled.

In addition, perceived support from family can also mediate the association between adolescent stress exposure and self-esteem in young adulthood. This relationship is tested in Model 2 and is represented by Path 2 of Figure 3. This model incorporates family atmosphere and family support from parents and grandparents.

Model 3 further examines the long-term effect of early self-esteem development during adolescence. As mentioned previously, adolescent self-esteem levels can be affected by stress exposures, social status and family support at the time. Meanwhile, Hypothesis 5 further suggests that adolescent self-esteem development can also affect one's self-esteem level in adulthood following Path 3 of Figure 3, which is tested in Model 3.

Hypothesis 4 also suggests that self-esteem levels in early adulthood are associated with adult social status in adulthood, following Path 4 of Figure 3. This relationship is tested in Model 4. At the same time, support from parents and grandparents can also mediate this process while also affecting adult self-esteem (Path 5 of Figure 3, which is tested by Model 5).

When testing these models, the minor change in the sample size is noteworthy. In order to satisfy the prerequisites of MICE, another 2 cases were dropped because they have missing values on adult self-esteem level, which is the dependent variable. Thus, there are 828 remaining cases in the analytic sample. Considering the relatively small sample size, situations of marginal significance ($p < 0.1$) are also discussed cautiously, as in previous analyses. The results of the regressions of self-esteem are presented in Table 3.

Table 3: Unstandardized regression coefficients from MICE estimate predicting adult self-esteem

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Adolescent Stress Exposure (Wave 2)					
Adolescent exposure to economic strain (Ref=not exposed)	-0.216 *	-0.202 *	-0.140	-0.068	-0.084
Family instability experience before 18 (Ref=stable)	0.102	0.128 #	0.143 *	0.144 *	0.135 #
Demographic Control Variables					
Age (In adolescence/Wave 2)	0.010	0.016	0.010	0.007	0.006
Gender (Ref=female)	-0.091	-0.086	-0.075	-0.064	-0.018
Other race/ethnicity (Ref=white)	0.093	0.095	0.078	0.085	0.093
Adolescent Family Support (Wave 2)					
Adolescent family atmosphere		0.098 *	0.082 #	0.051	0.044
Adolescent perceived support from parent		-0.014	-0.039	-0.019	-0.043
Adolescent perceived support from grandparent		-0.062	-0.062	-0.032	-0.090 #
Adolescent Coping Resource (Wave 2)					
Adolescent self-esteem			0.201 ***	0.167 ***	0.169 ***
Adult Stress Exposure/Social Statuses (Wave 3)					
Adult exposure to economic strain (Ref=not exposed)				-0.040	-0.041
Education: Four year college/university (Ref=some college)				0.114	0.121
Education: Master and above (Ref=some college)				0.374 ***	0.365 ***
Marital Status: Single with stable relationship (Ref=single)				0.046	0.030
Marital Status: Cohabiting (Ref=single)				0.005	0.001
Marital Status: Married (Ref=single)				0.280 *	0.235 *
Have children (Ref=no child)				-0.225 *	-0.211 *
Adult Family Support (Wave 3)					
Adult perceived support from parent					0.103 **
Adult perceived support from grandparent					0.109 *
Constant	-0.100	-0.191	-0.139	-0.313	-0.311
R-square	0.012	0.021	0.059	0.095	0.113
Adj R-square (Based on Fisher's z transformation)	0.006	0.011	0.049	0.076	0.094

*** $p < .001$; ** $p < .01$; * $p < .05$; # $p < 0.1$.

4.2.1 Model 1: long-term effect of adolescent stress exposure on adulthood self-esteem

Model 1 examines the long-term effects of adolescent experience of economic strain and family instability on self-esteem level in young adulthood. The result shows that exposure to economic strain during adolescence is significantly associated with lower self-esteem in early adulthood, net of age, gender and race/ethnicity. These results provide support for Hypothesis 4.

4.2.2 Model 2: mediating effect of perceived support in adolescence

Model 2 adds supportive factors into the model. The supportive factors include adolescent family atmosphere, parent-child and grandparent-child interaction. Their relationship with adult self-esteem and their possible mediating effect on stress exposure in adolescence is tested in Model 2. Results show that a supportive family atmosphere in adolescence can contribute to higher self-esteem in adulthood, which further supports Hypothesis 4. However, the effect of economic strain in adolescence was still significant, which suggests its effect is not mediated by family support.

It is noteworthy that the coefficient for family instability, which was not significant in Model 1, became marginally significant in Model 2. What's more, results suggest that experiencing family instability was associated with higher levels of self-esteem.

4.2.3 Model 3: possible consistency in self-esteem from adolescence to young adulthood

Model 3 further takes the adolescent Focal Child's self-esteem level into consideration, to test whether adolescent self-esteem is associated with self-esteem in young adulthood (Hypothesis 5), and whether self-esteem is influenced by stress exposures and family support in adolescence.

Results suggest that higher levels of self-esteem in adolescence are significantly associated with higher self-esteem levels in young adulthood, which supports Hypothesis 5. Also, the negative effect of exposure to economic strain in adolescence on adult self-

esteem is no longer significant, and the positive effect of supportive family atmosphere becomes only marginally significant now (it was significant in Model 2). Meanwhile, the association between family instability and higher levels of self-esteem in adulthood is now significant (it was only marginally significant in Model 2, at $p < 0.1$ level).

The results suggest that the negative effect of experiencing economic strain on adult self-esteem is mediated by adolescent self-esteem. In other words, economic strain may impair the development of self-esteem in adolescence, the effects of which can persist into adulthood. However, family instability experience is not necessarily detrimental to self-esteem in adulthood, as people's self-esteem may gradually recover from it. At the same time, supportive family atmosphere may contribute to higher adult self-esteem, partly by first promoting self-esteem in adolescence.

In sum, adolescent self-esteem can be seen as a crucial mediator, connecting adolescent life experiences with self-esteem in young adulthood. Meanwhile, such association is also possibly affected by changing social statuses as one grows up, which is examined next.

4.2.4 Model 4: the effect of living circumstance in young adulthood

Model 4 focuses on the possible effect of social status in young adulthood, such as poverty status, educational achievement, marital status, and the presence of children, on self-esteem. After adding these factors in the model, the coefficients for family instability and adolescent self-esteem level are still significant. Meanwhile, the effect of supportive family atmosphere, which was still marginally significant in Model 3, is no longer significant. It seems that a supportive family atmosphere not only influences self-esteem levels in adolescence, but also may affect adult self-esteem through its influence on social status in adulthood. In addition, completing a Master's degree or more, as well as getting married, is associated with higher self-esteem levels for young adults, however, parenthood is negatively correlated with self-esteem.

4.2.5 Model 5: the effect of family support in adulthood

In Model 5, support from parents and grandparents received in young adulthood are incorporated to further test Hypothesis 4. Support from both parents and grandparents

make a significant contribution to a higher self-esteem level in young adulthood. Also, the association between adolescent and adult self-esteem level is still intact, which further supports Hypothesis 5. Meanwhile, the effect of the experiencing family instability in adolescence becomes marginally significant.

It has been mentioned that family instability experience is not necessarily detrimental to self-esteem in adulthood, as people may gradually recover from it. From the results in Model 5, family support in adulthood is not only contributing to higher self-esteem, but also helps explain the recovery from family instability experienced in adolescence. However, grandparents' support in adolescence and adulthood seems to work in different ways, as those receiving support in adolescence may possess additional characteristics that affect self-esteem or may be affected by some unobserved factors.

Chapter 5

5 Conclusion and discussion

The present research is based on the stress process paradigm (Pearlin et al., 2005; Pearlin, 1989), which is complemented by the life course perspective. Their alliance has inspired research questions about how the stress process develops over time, especially the interaction between stress exposure, stress mediators and possible stress outcomes. One's stress exposure is part of the cumulative disadvantage process. At the same time, key life course concepts such as "linked lives" and "agency" (Elder, Jr., 1994) also contribute to a more comprehensive stress process throughout the life course. Family members cannot only serve as the source of stressors, but may also offer valuable support as stress mediators. In this respect, self-esteem is also a crucial coping resource that develops across the life course and may serve as a possible stress mediator.

Based on a life course stress process model, this research addressed the following research questions: 1) Does adolescent stress exposure affect mental health status in adulthood and beyond? 2) Are social statuses and stress exposures associated with mental health in adulthood, and do they mediate the effect of stress exposure in adolescence? 3) Do perceived support and coping resources operate as part of the life course stress process—and if so, how? Do they mediate the possible effect of stress exposure and social status on adult mental health? Are agentic coping resources (such as self esteem) influenced by stress exposures, social statuses and linked lives across the life course? Do agentic coping resources from adolescence persist into adulthood? Specific hypothesis emerging from these research questions were tested, by estimating two sets of multiple regression models using the NSFH data. The results have identified several working mechanisms in the life course stress process model as possible answers to the research questions.

5.1 The observed pathways within the life course stress process model

The primary goal of this research is to explore the possible relationship between one's early stress exposures in adolescence and later mental health status in adulthood. The results indicate that one's exposure to economic strain and family instability in adolescence is not directly associated with the level of depressed affect in adulthood. Instead, early stress exposures in adolescence and later mental health status in adulthood are bridged by one's development of self-esteem. The experience of economic strain and family instability in adolescence impairs one's self-esteem at the time. Meanwhile, adolescent self-esteem levels continue to affect self-esteem levels into young adulthood and beyond, and adult self-esteem is significantly associated with levels of depressed affect. This process remains significant even after considering the possible influence of adult statuses, which has been demonstrated as a crucial dynamic within the life course stress process. As described in Figure 4, the development of self-esteem serves as the pathway through which one's stress exposures in adolescence affect stress outcomes in young adulthood.

In addition, adolescent experiences of family instability seem to have a net positive relationship with adult self-esteem, while its negative effect is expressed through adolescent self-esteem. One possible explanation for this unexpected relationship is that self-esteem gradually recovers from the experiences associated with early family instability in adolescence (Path 2 in Figure 4).

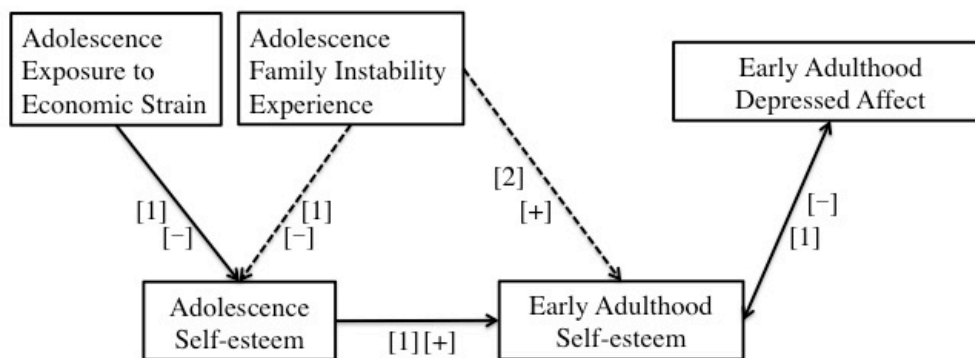


Figure 4: Observed pathways from adolescent stress exposure to adult depressed affect

From the second research question, the present research is also interested in examining whether social statuses and stress exposures in adulthood are related to mental health, mediating the effect of early stress exposure in adolescence. Results show that some adult social statuses, such as experiencing economic strain, higher educational attainment, and the resources provided by marriage or cohabitation are directly associated with levels of depressed affect in adulthood. At the same time, adult social status, including having a Masters degree and above, being married, and having one or more children, is also associated with self-esteem level in adulthood. Considering adult self-esteem is associated with adult depressed affect, one's social status, self-esteem, and depressed affect appear to be interrelated in adulthood, as described in Figure 5. However, possible

mediating effect of adult social status on the relationship between stress exposure in adolescence and depressed affect in adulthood is not observed in this research.

This research is also concerned about whether family support and self-esteem mediate the effect of stress exposure in adolescence and social statuses in adulthood. The mediating effect of self-esteem is discussed earlier, and it is possible that family support can be impaired by family instability in adolescence, affecting one's mental health status in adulthood. However, such possible association is not observed in the present research. Still, perceived family support in adolescence and early adulthood is playing a unique role in the life course stress process, and correlates with one's self-esteem in different ways.

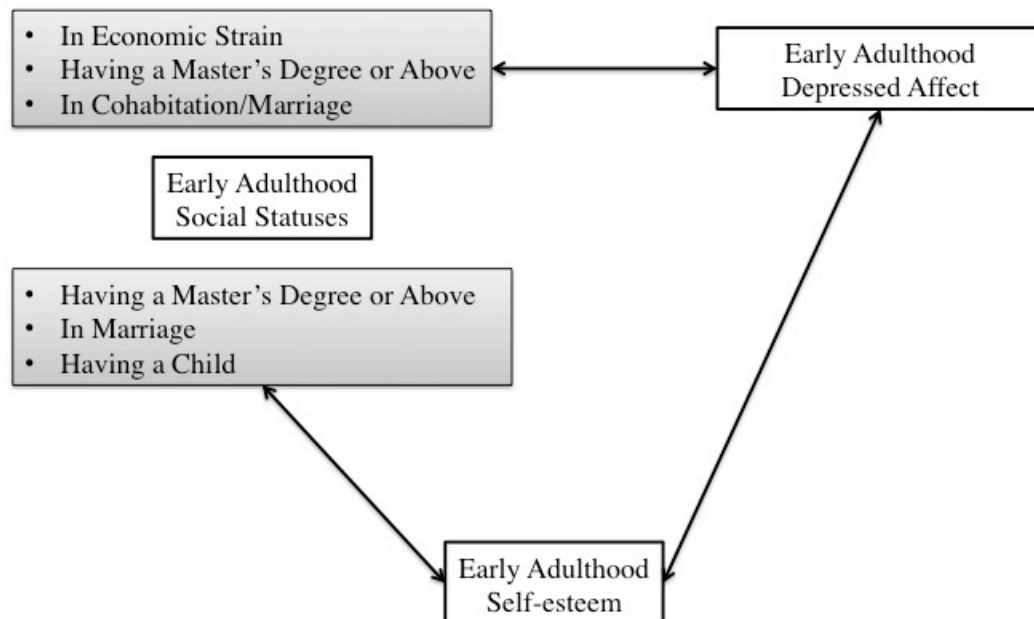


Figure 5: Observed pathways from adult social statuses to depressed affect in adulthood

Results from the first set of models have revealed that a supportive family atmosphere in adolescence may help a child to achieve more advantaged adult social statuses, which are in turn associated with lower levels of depressed affect. This process is presented as Path 1 in Figure 6. A supportive family atmosphere in adolescence can also contribute to a lower level of depressed affect through promoting self-esteem in adulthood, following two possible pathways (illustrated as Path 2 and Path 3 in Figure 6). Path 2 shows that adult resources and social status may mediate the association between adolescent supportive family atmosphere and adult self-esteem. At the same time, adolescent family atmosphere may first affect self-esteem levels during adolescence and thus influence its subsequent development in adulthood (following Path 3).

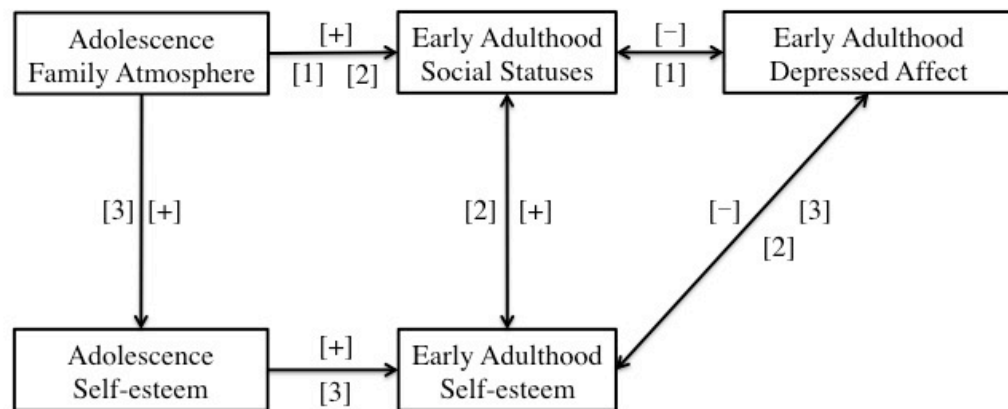


Figure 6: Observed pathways from early family atmosphere in adolescence to adult depressed affect

As part of the family support, the effect of parental support is not significant during adolescence. However, in early adulthood, a higher level of parental support is significantly associated with a lower level of depressed affect, and possibly associated with higher educational achievement. At the same time, higher educational achievement is associated with higher levels of self-esteem, which possibly contributes to lower levels of depressed affect in adulthood. A direct association between high educational achievement and adult depressed affect is not observed in the present research, however. These relationships are illustrated in Figure 7.

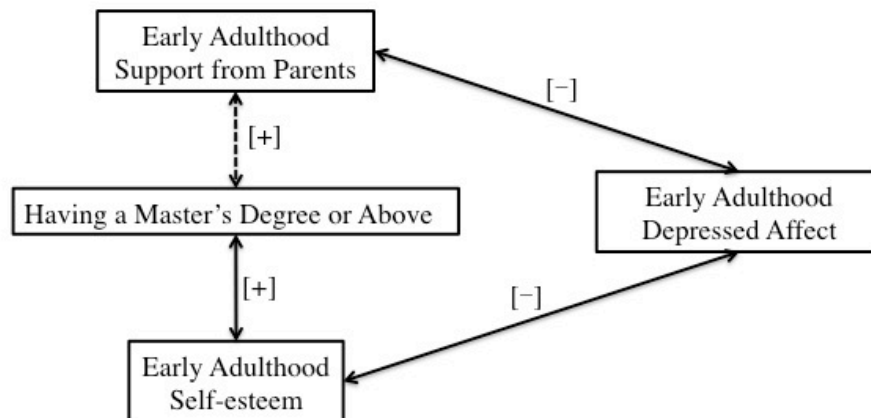


Figure 7: Observed pathways from parental support in adulthood to adult depressed affect

Findings also suggest that support from grandparents during adolescence is associated with higher levels of depressed affect as well as lower levels of self-esteem in young

adulthood. These relationships are in contrast with common expectations, possibly due to unobserved factors and underlying mechanisms, which is discussed later as possible future directions. However, in adulthood, support from grandparents is positively associated with adult self-esteem, possibly alleviating the consequence of early family instability experiences in adolescence on self-esteem in adulthood. The mechanisms related to grandparents' support are presented in Figure 8.

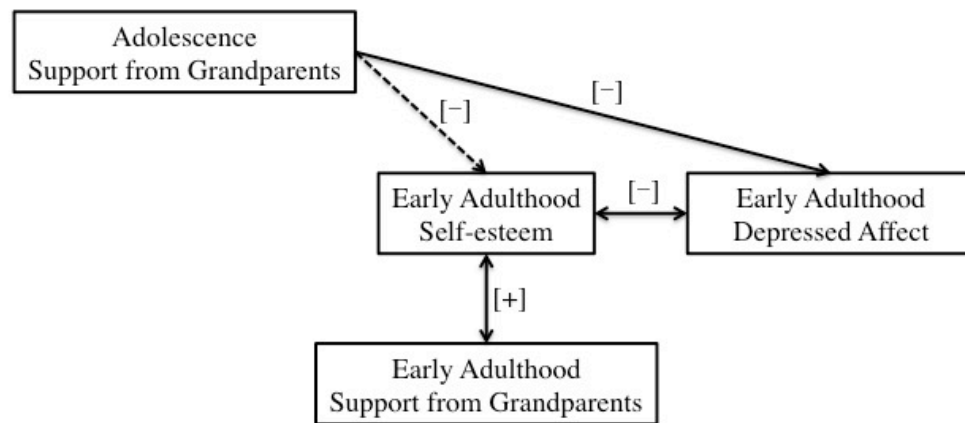


Figure 8: Observed pathways from grandparents' support to adult depressed affect

5.2 Contributions, future directions and limitations

The present research supports the idea of taking intervention to protect young people from the enduring consequences of early stressful experiences in adolescence. The answer to the first research question suggests that the experience of economic strain and family instability in adolescence would impair one's self-esteem at the time. Meanwhile,

early self-esteem levels in adolescence would continue to affect their counterpart in young adulthood and beyond, which is associated with depressed affect.

This finding supports previous research (e.g. Shanahan, 2000) which suggests that agency during the adolescent years is crucial for one's development throughout the life course. The possible long-term effect of self-esteem on mental health outcomes supports the importance of early interventions. Self-esteem can be fostered and promoted by social programs targeting disadvantaged groups, to counter the harmful effects of economic strain and family instability on the resources that are required for exercising effective agency. In the long run, the benefits of acquired agency would accumulate over time as part of a cumulative advantage process, as Syme (1998) has observed in the Ypsilanti Preschool Program. In this way, such interventions may alleviate the negative effects of early stress exposure in childhood and adolescence. Meanwhile, levels of self-esteem during adolescence and even childhood may elicit different reaction to stressful situations, and in other words moderate the effect of stress exposure. Such a moderating process is not tested in this research and should be taken into consideration in the future.

At the same time, current research can be improved by incorporating more comprehensive measures of stress exposure and social status in both adolescence and young adulthood. Stress exposure can take multiple forms, including early and recent life events, chronic stressors, major lifetime traumas and discrimination stress (Turner & Avison, 2003; Turner & Lloyd, 1995; Turner et al., 1995). Comprehensive measures may help capture additional stress processes, as well as stress interaction and proliferation. In addition, comprehensive measurements of stressors should also be examined with the context of parents and even grandparents (if data permits), as some stressors are shared within linked lives. When it comes to the measures of stress outcomes, the present research focused on depressed affect as a major aspect of psychological distress, which is a limitation of this research. This line of research can be further improved by incorporating more dimensions of psychological distress in addition to depressed affect, such as positive affect, somatic and retarded activity, and interpersonal relationship. Incorporating other related scales can also help with this goal when it is supported by the

data. Also, it would be worthwhile to trace the mechanisms to these stress outcomes across the life course from adolescence into middle- and old-age.

The present research can also be improved by incorporating more comprehensive measures of agency. As described earlier in the literature review, the concept of agency can be quite broad and inclusive, and self-esteem is only part of it. For example, personal mastery is also an important aspect of agency, which is also measured in the NSFH; however, in the NSFH the reliability of the personal mastery measures was too low to allow them to be combined as a latent variable for this analysis. This limitation can be addressed by using a different dataset in the future.

Also, one's understanding of agency and the reaction to the measuring scale can be different in adolescence and in young adulthood. Present research has tried to address this possibility by using PCA, where age-specific agency measurements can be more appropriate. Considering PCA has many preferable characteristics, a potential downside of using PCA to derive a descriptive factor is that the weighting process may make the interpretation of the factor more dependent on the sample distribution, and deviate from the original concept.

The effects of adult social status on the life course stress process are observed in the present research. Social status and resources are, however, continuously changing across the life course. In future research, modeling social statuses as dynamic interlocking trajectories can help better portray one's life experiences. Also, changes in social status may introduce additional sources of support and coping resources that have long-term effects on mental health. As observed in this research, both cohabitation and marriage are associated with lower levels of depressed affect, which is possibly explained by the practical and emotional support accompanying the relationship. Future research should also consider the potential long-term benefits of other forms of support, such as those associated with work, and the pathways through which these supports are associated with levels of self-esteem, psychological distress and other stress outcomes.

The results related to the role of family support are also worth exploring further. As mentioned earlier, using factors derived by PCA can give a more comprehensive general

description about perceived family support levels, while at the same time making it harder to give a precise interpretation of the factor. This research has considered the family atmosphere as a perceived supportive factor, which is associated with adult depressed affect and self-esteem in multiple ways. In addition to available parental support, the family atmosphere is a comprehensive and subjective measurement, and is possibly influenced by many factors including family size, everyday interaction between family members, the relationship between siblings, and parenting styles. Future research on family atmosphere and family members' interaction would further reveal the diversity in family support as part of the life course stress process. On the one hand, family support may be impaired by stress exposure as a possible mediator to stress outcomes; on the other hand, it may also work as a stress moderator, as individuals who have more available family support may better deal with the impact of stressors.

It is surprising to see that support from grandparents in adolescence is associated with higher levels of depressed affect as well as lower levels of self-esteem in young adulthood. Possible race differences in the effect of grandparent support were also tested by an interaction term, which was not significant (and not shown in the results section). These surprising findings raise the possibility that some important facets of grandparent support, such as the nature of the support, has not been captured in the analysis. For example, it is possible that grandparents can be over protective and spoiling to their grandchildren, or that their more traditional expectations and values may conflict with the contemporary values of youth in late-modern society. There may also be emotional stressors related to the declining health of the grandparents, or stressors associated with additional domestic responsibilities for caring for grandparents (e.g., forgoing extra-curricular activities in order to contribute to care taking). Still, the support from grandparents is a crucial factor to be considered in the life course stress process. In addition, possible selection effects associated with differences in families which more heavily rely on multi-generational support systems needs to be taken into consideration in future research. For example, children's higher levels of depressed affect and lower self-esteem are possibly the result of parents' work-family conflict among families who rely more heavily on the support of grandparents.

In sum, the present research has examined a life course stress process model based on previous literature and tested the major pathways in it. The model serves as a powerful tool to trace the cumulative processes in health and mental health from the life course perspective. It is also a flexible model, which is open for expansion to assist future research.

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Appendices

Appendix A: Supporting information for the scales used in the present research

Focal Child's depressed affect in early adulthood

At Wave 3, Focal Child's psychological distress level in early adulthood was measured using 4 selected items from the Center for Epidemiological Studies-Depression Scale (CES-D). Answers to the following questions ranged from "0=No days" to "7=Seven days"

"On how many days during the past week did you feel you could not shake of the blues even with help from your family and friends?"

"On how many days during the past week did you feel lonely?"

"On how many days during the past week did you feel sad?"

"On how many days during the past week did you feel depressed?"

Focal Child's self-esteem level in adolescence and young adulthood

Focal Child's self-esteem level was measured using three items from the Rosenberg (1965) self-esteem scale (measured at Waves 2 and 3). The three items were:

"I feel that I am a person of worth, at least on equal basis with others."

"I am able to do things as well as most other people."

"On the whole, I am satisfied with myself."

(The Focal Child was asked about the extent to which s/he agrees with the statements in a 4-point scale from "Strongly Disagree" to "Strongly Agree".)

Focal Child's perceived support from parents/parental figures

The Focal Child's support from parental figures in adolescence was measured based on the following questions:

"Taking all things together, on a scale from 0 to 10, where 0 is really bad and 10 is absolutely perfect, how would you describe your relationship with your mother/step-mother/father's partner?"

“How would you describe your relationship with your father/step-father/mother’s partner?”

“If you felt depressed or unhappy, how likely would you be to talk to your mother/step-mother/father’s partner?”

“How likely would you be to talk to your father/step-father/mother’s partner?”

(The answers were based on a 5-point scale from “definitely wouldn’t” to “definitely would”.)

“If you had a major decision to make, how likely would you be to talk to your (mother/step-mother/father’s partner)?”

“How likely would you be to talk to your (father/step-father/mother’s partner)?”

(The answers were based on a 5-point scale from “definitely wouldn’t” to “definitely would”.)

Meanwhile, the Focal Child’s support from parental figures in adulthood is measured based on the following questions:

“Taking things all together, on a scale from 0 to 10, where 0 is really bad and 10 is absolutely perfect, how would you describe your relationship with your mother?”

“How would you describe your relationship with your father?”

“How likely is it that you would talk to your mother if you felt depressed or unhappy?”

“How likely is it that you would talk to your father if you felt depressed or unhappy?”

(The answers were based on a 5-point scale from “definitely wouldn’t” to “definitely would”.)

“How likely is it that you would talk to your mother if you had a major decision to make?”

“How likely is it that you would talk to your father if you had a major decision to make?”

(The answers were based on a 5-point scale from “definitely wouldn’t” to “definitely would”.)

Focal Child's perceived support from grandparents

The Focal Child's support from grandparents in adolescence is measured based on the following questions:

"On a scale from 0 to 10, where 0 is not at all close and 10 is extremely close, how would you describe your relationship with maternal grandmother?"

"How would you describe your relationship with maternal grandfather?"

"How would you describe your relationship with paternal grandmother?"

"How would you describe your relationship with paternal grandfather?"

"During the last year, about how often did you talk on the telephone or receive a letter from your (grandmother/grandfather/grandparents) on your mother's side?"

"How often did you talk on the telephone or receive a letter from your (grandmother/grandfather/grandparents) on your mother's side?"

(Possible answers include "not at all"; "about once a year"; "several times a year"; "1-3 times a month"; "about once a week"; "several times a week" or "(grandmother/grandfather/grandparents lives with the respondent".)

"If you had a major decision to make or if you felt depressed or unhappy, how likely would you be to talk about it with (any of your grandparents/your grandparent)?"

(The answers were based on a 5-point scale from "definitely wouldn't" to "definitely would".)

The Focal Child's support from grandparents in adulthood is measured based on the following questions:

"On a scale from 0 to 10, where 0 is not at all close and 10 is extremely close, how would you describe your relationship with your grandmother on your mother's side?"

"How would you describe your relationship with your grandfather on your mother's side?"

"How would you describe your relationship with your grandmother on your father's side?"

“How would you describe your relationship with your grandfather on your father's side?”

“How would you describe your relationship with (your step-mother/step-father)'s mother?”

“How would you describe your relationship with (your step-mother/step-father)'s father?”

“During the last year, about how often did you see, talk on the telephone, or receive a letter or e-mail from your (grandmother/ grandfather/grandparents) on mother's side?”

“How often did you see, talk on the telephone, or receive a letter or e-mail from your (grandmother/ grandfather/grandparents) on your father's side?”

“How often did you see, talk on the telephone, or receive a letter or e-mail from (your step-mother/ step-father)'s (father/mother/parents)?”

(Possible answers include “not at all”; “about once a year”; “several times a year”; “1-3 times a month”; “about once a week”; “more than once a week”; “the respondent lives with grandmother/grandfather/grandparents”.)

“If you had a major decision to make or if you felt depressed or unhappy, how likely would you be to talk about it with (your grandparent/any of your grandparents)?”

“How likely would you be to talk about it with (your step-mother/step-father)'s (father/mother/parents)?”

(The answers were based on a 5-point scale from “definitely wouldn't” to “definitely would”.)

Family atmosphere in adolescence

In the present research, the family atmosphere is evaluated based on the Focal Child's responses (based on a 4-point scale from “not at all true” to “very true”) to the following statements:

“Our family has fun together”

“Things are tense and stressful in our family”

“Family members show concern and love for each other”

“Family members feel distant and apart from each other”

“Our family works well together as a team”

Appendix B: Details about Multiple Imputation (MI) process and Multiple Imputation by Chained Equations (MICE) used in the present research

In case there are missing values in the data, Multiple Imputation can give an unbiased estimate of the model with efficient standard error in three steps of analysis (White et al., 2011). First, unknown missing data is replaced by simulated values suggested by the predictive distribution of missing data conditional on the observed data. This process is repeated multiple times to incorporate all sources of variability and uncertainty into the imputed values so as to create a series of imputed datasets. Then the data sets are analyzed separately to give different results. After that, these estimates are combined into an overall result using Rubin's rules. The major advantage of MI over Single Imputation is its ability to capture the between-imputation variance (White et al., 2011).

Following the general workflow of MI, MICE is a practical approach to generating imputation with a special advantage in handling binary and categorical variables (SSCC, 2013; White et al., 2011) (For a detailed description of the mechanism of MICE, see White et al., 2011). As White and his colleagues mentioned (2011), one potential concern is that the justification of MICE is based on empirical studies rather than statistical arguments and proven mathematical properties, so analysis based on complete-cases and imputation with mean-value are also conducted elsewhere to support the estimation given by MICE (not presented in this paper).

Rationale for using Multiple Imputation by Chained Equations in current research

One reason for using MICE in the present research is the pattern of missing values within the dataset. Among the 868 observations, 576 (66.36%) of them are complete cases. It is within the capability of MICE, which generally requires the missing cases should be less than 50%. At the same time, it is noteworthy that the majority of the cases (97.58%) have only 2 or fewer missing variables, and the highest percentage of missing data among the variables is 12.33%. List-wise deletion would rule out a significant portion of cases, sacrificing statistical power and much useful information, and even possibly bias the result for only one or two missing values in a case. Handling the missing data with MICE would make a better use of the information in the data with a stronger statistical power by

making more cases usable. The estimation is also likely to be more precise, compared with simple imputation methods such as imputing mean values.

Additionally, MICE is preferred to list-wise deletion because the missing values do not satisfy MCAR (Missing Completely At Random: the missing does not depend on either observed or unobserved factor), instead, they are more likely to be MAR (Missing At Random: the probability of data being missing depends on observed data rather than unobserved factors) since some missing is related to other variables. Using list-wise deletion in MAR contexts would bias the results (SSCC, 2013). For variables with more than 5% missing observations, logit models (not shown) were used to test whether their missing status is related with other variables (SSCC, 2013). Results show that missing variables in family atmosphere in adolescence were related to available support from parents at the time as well as race; missing variables in support from grandparents in adulthood were likely to be related with available support from parents in adolescence (it was not statistically significant here, but it makes sense in theory, as parent-child relationship would affect child's relationship with grandparents); missing variables in income status as a young adult were related with one's relationship with grandparents in adolescence and age; missing variables in one's educational achievement/aspiration were related with one's experience of family instability in adolescence and whether one has children or not at Wave 3.

In this way, using MICE is an appropriate way to deal with the missing values in current research, considering the data are likely to be MAR. This assumption is better satisfied when more explanatory variables are included in the model (White et al., 2011). It is generally impossible to prove MAR from MNAR (Missing Not At Random: the probability of missing depends on both observed and unobserved factors) from the observed dataset (White et al., 2011). Practically MNAR is inevitable but it is usually not sufficient to bias the analysis by itself (Collins, Schafer, & Kam, 2001; Graham, 2009), though it is not proved theoretically (SSCC, 2013).

Imputation model specification

There are two suggestions for avoiding bias and gaining precision when selecting variables into the imputation model (SSCC, 2013; White et al., 2011). The first is that all variables in the planned analytic model, including the outcome/dependent variables in each step of analysis, should be part of the imputation model. The second is that other variables that may relate with the true value of the missing data or the probability of being missing can be included in the imputation model.

Including the outcome/dependent variables in the imputation model would benefit the overall model accuracy, since the observed values of the dependent variables can provide information about other missing values in the independent variables (SSCC, 2013).

Otherwise, for cases with an observed dependent variable and imputed independent variables, the coefficients of the independent variables with imputation would be biased towards zero (because the relationship between the independent variables with missing values and the dependent variable is not considered in previous imputation process). In addition, for cases with missing dependent variables, their observed data on independent variables will also contribute to the accuracy of the imputation model.

The imputation model is supposed to “include every variable that both predicts the incomplete variable and predicts whether the incomplete variable is missing,” in order to make MAR assumption more plausible and strengthen the model (White et al., 2011). However, even though the imputation model is not sensitive to auxiliary variables, it should not be treated as a “kitchen sink” but should instead follow the guidance of theory (SSCC, 2013). In practice, fitting a large imputation model may also bring problems in model stability, suggesting that the model should be simplified without damage by ruling out unnecessary variables (White et al., 2011). Current research is based on the comprehensive life course stress process model, with broad selection of necessary variables to satisfy the MAR assumption. Thus the imputation model is constructed without auxiliary variables.

The use of auxiliary variables in imputation is also associated with the construction of analytic models. For cases with imputed dependent variables, debate is ongoing as to

whether dependent variables should be excluded from the analysis, as including them would possibly add noise to the estimates (Azur, Stuart, Constantine, & Leaf, 2011; SSCC, 2013; White et al., 2011). Meanwhile, excluding cases with an imputed dependent variable from analysis are likely to give smaller Monte Carlo errors and standard errors (White et al., 2011), which is more plausible in practice. Including cases with imputed dependent variables may be worth considering if the auxiliary variables are highly correlated with the dependent variables as part of the imputation model (White et al., 2011). In the present research, however, no auxiliary variable is included in the imputation model. Therefore, cases with missing dependent variables are included in the imputation process, but they are excluded from the following analysis.

Number of imputations

When it comes to deciding the number of imputations, a simple “rule of thumb” has been applied and further tested by Monte Carlo error. It is generally suggested that the number of imputations should at least equal the percentage of incomplete cases, as long as this percentage is smaller than 0.5 (Bodner, 2008; White et al., 2011). It may also be appropriate to have only a small number of imputations, anywhere from 3 to 20, while increasing the number of imputations is unlikely to cause any problems (SSCC, 2013). Since there are 292 incomplete cases (33.64%) in the current sample, the number of imputations is set at 40. Consistent with the “rule of thumb,” the Monte Carlo error will also be calculated after the estimation, and examined according to the following criteria:

[T]he Monte Carlo error of a coefficient should be less than or equal to 10% of its standard error; the Monte Carlo error of a coefficient’s T-statistic should be less than or equal to 0.1; the Monte Carlo error of a coefficient’s *p*-value should be less than or equal to 0.01 if the true *p*-value is 0.05, or less than or equal to 0.02 if the true *p*-value is 0.1 (SSCC, 2013; White et al., 2011, p. 388).

The imputation of the scales and constructed variables: Some clarifications

In the present research, some variables and scales are processed by PCA, and the constructed indices are included in the imputation model. An alternative way is to impute each related variable or each item in a scale separately and construct a new representative

variable thereafter. This alternative way is rejected in favor of imputing the constructed indices for the following reasons. One reason is that the variables constructed after imputation, or “passive variables,” can be potentially problematic, especially when transformations, non-linearity, and interactions are involved (SSCC, 2013). Another reason is that the Principal Component Analysis (PCA) is not currently supported (in Stata) for imputed data. PCA is helpful when creating a comprehensive variable and is beneficial for the current research. It can synthesize the information from a series of related variables, even if they are describing multiple aspects of the same thing in different measurements. PCA allows for the creation of a new variable to capture latent concepts, such as the Focal Child’s family atmosphere in adolescence and perceived support from parents and grandparents. Imputing the new variable constructed by PCA can also avoid involving too many variables in the imputation model, especially when these variables are likely to correlate and interact with each other and introduce bias into the model.

In addition, the percentage of missing data in each constructed variable is not high in the present research. It is acceptable to discard the partial data and impute the constructed variables directly (Graham, 2009). In sum, the ultimate goal for MICE is not to predict each missing value precisely, but to give an unbiased estimate with the largest possible number of cases and good statistical power. Imputing the variables processed by PCA is likely to contribute to this goal.

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