THREE ESSAYS ON PARENTAL HEALTH ADVERSITIES AND CHILDREN'S
EDUCATIONAL OUTCOMES

by

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(Under the Direction of Patryk Babiarz, Ph.D.)

ABSTRACT

This dissertation examines the role of parental illness on a child's academic achievement using data from multiple waves of the Panel Study of Income Dynamics and its Transition to Adulthood Supplement (PSID-TAS). Through three essays, I investigate the effects of parental illness on high school GPA, the prospect of college education, and academic achievement in college. The first essay investigates how the high school graduation GPA of children whose parents experienced chronic illness onset before graduation compares to the GPA of children whose parents remained healthy. I find a significant negative relationship between the GPA and the severe maternal physical illnesses or mental health issues that occurred before her child's high school years. The second essay tests the impact of parental illness on the child's odds of college enrollment measured at the age of 21 or younger and the expectation to complete four years of a college education. The estimations reveal that maternal illness, specifically severe or mental health conditions, and the simultaneous occurrence of 4 or more health conditions significantly and negatively influence the child's expectation of completing a 4-year college degree and actual college enrolment at age 21 or younger. The study also revealed that a father's severe illness experienced before high school slightly reduces a child's odds of college

enrollment. Further, children who have mothers with a health condition diagnosed before the commencement of high school have lower expectations of completing four years of college. The third essay utilizes the panel dimension of TAS data to examine the "within" variation in the GPA of college students employing the fixed effects estimation method and tests how the onset of chronic parental illness experienced when a young adult is enrolled in college affects their academic performance. I find a significant negative relationship between severe maternal physical illness and the child's college GPA. Findings from this dissertation emphasize the far-reaching consequences of parental illness on a child's schooling and college success. To mitigate some of the impacts of parental illness, educational institutions could improve overall support mechanisms for children, especially those who enter school and universities with pre-existing parental illnesses.

INDEX WORDS: parental illness, severe illness, mental illness, GPA, academic achievement, college enrollment, college expectation, economic status, parent-child relationship, parental marital status

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DEDICATION

This dissertation is dedicated to all the individuals supporting ailing family members and particularly to the children growing up amidst parental illness.

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CHAPTER 1

INTRODUCTION

Chronic diseases have become increasingly prevalent in the United States, affecting a large proportion of the adult population. Health conditions such as heart disease, cancer, diabetes, or respiratory diseases are often long-lasting and can significantly impact an individual's quality of life. According to the Centers for Disease Control and Prevention (CDC), six in ten adults in the US live with a chronic disease, while four in ten adults suffer from two or more chronic diseases (CDC, 2022a). Roughly 90% of the nation's annual healthcare expenditures (about $4.3 trillion in 2021) are for people with chronic and mental health conditions (Buttorff et al., 2017; CMMS, 2021).

When an individual becomes ill, the negative effects can be felt by all members of the family and particularly so by children. Approximately 14% of children in the United States experience chronic parental illness during adolescence (CDC, 2001). An onset of parental illness can be stressful for children at any age and could lead to profound negative implications such as emotional difficulties, increased risk of other mental health issues, sleep disturbance, social isolation, and behavioral problems. Experiences of such events in adolescence and young adulthood could adversely impact academic performance and, in turn, interfere with both secondary and tertiary educational attainments leading to additional potentially long-lasting negative effects. The time spent in high school constitutes a critical formative phase in life because of the unique physical, cognitive, and social changes that a child experiences during this life stage (Gariepy et al., 2017). Parental illness experienced in this sensitive period can cause

enormous financial and emotional challenges to children and their families, inflicting impacts that could last into adulthood (De Neve & Oswald, 2012; Keyes, 2006).

Understanding the impact of parental illness on adolescent children's and young adults' well-being is important for a few reasons. First, millions of children in the United States and worldwide are affected by parental illness, and the prevalence is likely to increase given the aging population and the rising rates of chronic illnesses. This indicates that the impact of parental illness on children's development and education is a significant public health issue and a vital research area. Research exploring the stressors and challenges associated with how a parental illness impacts the well-being of children allows educators and professionals to devise targeted interventions, allocate resources efficiently and establish customized strategies to help affected children succeed academically. Further, such research can inform education policies and practices, leading to improved support systems for families dealing with illness and building resilience in children facing these challenges. Second, such research can contribute to a better understanding of the complex interplay between family, health, and child development. For example, research in this area can highlight the importance of taking a family-centered approach to healthcare, where the patient's and their children's needs are considered and addressed simultaneously, and support is provided to promote the family's overall well-being.

While several extant studies address the adverse consequences of children's sickness on parents and families, there is limited literature studying the impact of parental illness on children. In this project, I address this gap in the literature by examining the effect of parental illness on various educational outcomes of children. Previous studies investigating parental illness's impact on children's educational attainment have been conducted in non-U.S. contexts, primarily in Europe (e.g., Aaskoven et al., 2022; Kristiansen, 2021). However, due to the differences in

health care systems and social safety nets, findings from such studies might not be fully generalizable to other countries. In light of this literature deficiency, my dissertation aims to investigate how the onset of chronic illness impacts outcomes related to the child's secondary and tertiary education. I use the 1999-2019 waves of the Panel Study of Income Dynamics (PSID) and the 2005-2019 waves of the PSID's Transition to Adulthood (TAS) supplement to execute three empirical studies on the effects of parental illness on various measures of their children's educational outcomes.

In the first essay, I test how the high school graduation Grade Point Average (GPA) of children whose parents experienced an onset of chronic illness before graduation compares to the GPA of children whose parents remained healthy. I estimate a series of regression models designed to identify the effects of health conditions experienced separately by the father and the mother and shed some light on the heterogeneity of the said effects by the type and severity of parental health conditions (e.g., cancer, stroke, heart disease, psychiatric problem, etc.). In an additional exercise intended to highlight some of the mechanisms of how the poor health of parents affects their child's school performance, I also estimate model specifications with control variables that proxy for the potential disruption of the parent-child relationship, marriage breakup, or economic strain that parental illness inflicts on the family.

In the second essay, I test the effect of parental illness on transitions from the secondary to the tertiary stage of education. The TAS survey includes a question that inquired about the respondents' views of how far they thought they would go in school. I use responses to this question to examine the variation in expectation of attending college brought about by parental illness diagnosed before the children's high school graduation. Further, I test whether the probability of attending college by the time the respondent turns 21 is different between the

groups of children whose parents did or did not experience onsets of chronic health conditions before their child graduated from high school.

Finally, in the third essay, I utilize the panel dimension of TAS data to examine the "within" variation in the GPA of college students. Employing the fixed effects estimation method that implicitly controls for unobserved time-invariant individual heterogeneity, as well as a rich set of time-variant socio-demographic control variables, I test how the onset of chronic parental illness experienced when a young adult is enrolled in college affects their academic performance.

CHAPTER 2

ESSAY 1: THE EFFECT OF PARENTAL ILLNESS ON HIGH SCHOOL GPA

INTRODUCTION

Earning good grades in high school is important for several reasons. High school grades are a strong predictor of college attendance due to their mechanical relationship with college admissions criteria (Bowen et al., 2009). Numerous empirical studies have consistently demonstrated that high school grade point average is a powerful predictor of tertiary educational attainment. For example, Zheng et al. (2002), Noble and Sawyer (2004), and Cyrenne and Chan (2012) found that high school GPA is a stronger correlate of college academic success (measured as college GPA) than standardized test scores such as ACT or SAT. In addition to academic achievements, high school grades also positively correlate with college students' extracurricular involvement, retention, and satisfaction with their college or university (Hoffman & Lowitzki, 2005). Moreover, studies have found that compared to college admission test scores, high school grades are more strongly associated with college graduation rates (Allensworth & Clark, 2020; Galla et al., 2019; Denning et al., 2022). Further, students' high school grades significantly affect their long-term earnings (Miller, 1998), with estimates suggesting that a one-point increase in high school GPA raises annual earnings in adulthood by around 12 percent for men and 14 percent for women (French et al., 2015).

An extensive amount of academic literature examines the determinants of high school GPA. Demographic variables such as gender, race, and socioeconomic status (SES) have been shown to correlate with GPA. For example, studies suggest that females tend to earn higher

grades than males (Hoffman & Lowitzki, 2005), and students from higher SES backgrounds are more likely to have higher GPAs (Lubbers et al., 2010). Prior studies have also considered the associations between high school GPA as the dependent variable and performance in middle school (Chen & Gregory, 2009; Yeager et al., 2014), parental involvement, and parenting practices (Mandara et al., 2012; Xu & Corno, 2003), student characteristics such as motivation, engagement, and self-efficacy (Dweck, 2008; Fredricks et al., 2016; Pajares & Schunk, 2001; Vansteenkiste et al., 2009), or school-related factors such as teacher quality, school resources (Hattie, 2009; Johnson et al., 2016; Lubienski et al., 2013).

The purpose of this essay is to contribute to the literature on the determinants of high school GPA by measuring the association between the onset of parental illness and the variation in high school graduation GPA. Parental illness can have a significant impact on a student's high school GPA through multiple mechanisms. Coping with an ill parent often leads to increased psychological distress for the student, which can affect their ability to concentrate, learn and perform well in school (Chen, 2017). Parental illness is also likely to cause disruptions in the family's social and economic environments, including changes in family members' routines and responsibilities, which can lead to reduced parental support and monitoring of the academic performance of their children. Such changes can further lead to a decline in the student's motivation and engagement with school (Li et al., 2017).

In the following section, I review the extant literature on the broad determinants of GPA, along with the empirical evidence on the conceptual mechanisms underlying the association between parental illness and the academic performance of their offspring. Subsequently, I discuss the study methodology, encompassing the empirical model, data sources, and measurement of variables.

LITERATURE REVIEW

The determinants of high school grades can be classified into three domains: child-related, school-related, and family-related factors. For instance, a child's health status, both physical and mental, has been shown to impact educational attainment (Case et al., 2005; Currie, 2009; Smith & Smith, 2010). Other examples of child-related factors that may affect high school grades include the child's motivation, self-esteem, and attitude toward learning (Wentzel & Wigfield, 2007) or cognitive factors such as intelligence, cognitive abilities, and memory (Bornstein & Lamb, 2011). Examples of school-related factors known to impact a child's educational outcomes include teacher-student relationships (Roorda et al., 2011; Sethi & Scales, 2020), teacher effectiveness and classroom management practices (Wenglinsky, 2002), school resources or school climate/culture (Borman & Rachuba, 2001; Wang & Degol, 2016). Given that this essay focuses on the impact that parental illness exerts on a child's high school GPA, I provide a more detailed discussion of how different parent-related factors affect the academic performance of their children in the remainder of the literature review. In particular, I review the conceptual mechanisms and the supporting empirical evidence that explains the pathways of how parents' health might affect their children's academic performance in high school.

Parental Illness and School Performance

Prior studies have reported that parental illness, especially maternal illness, could lead to lower grades, lower test scores, higher school absenteeism, and lower rates of high school completion (e.g., Aaskoven et al., 2022; Bratti & Mendola, 2014; Chen & Fish, 2013). For example, Dura and Beck (1988) interviewed several households where a mother reported suffering from chronic pain. Their study found that children from such households had a higher number of school absenteeism days as compared to children of mothers without illness. Chen

and Fish (2013) interviewed 189 mothers diagnosed with chronic illnesses (multiple sclerosis, diabetes, cancer, HIV/AIDS, chronic pain, asthma, myelodysplastic syndrome, or fibromyalgia) with a child in middle school or high school (age 10-18 years). They found reports that children's grades were negatively related to the weight of the burden that the illness imposed on family functioning. Bratti and Mendola (2014) analyzed data from the Bosnia and Herzegovina Living Standards Measurement Survey conducted by the World Bank between 2001 and 2004. They revealed that children whose mothers reported poor health had a seven percentage points lower likelihood of being enrolled in school at ages 15-24, whereas no significant effects were found for fathers. These results were confirmed when health was measured using less subjective measures such as an index of limitations in activities of daily living. Conversely, Chen (2014) measured both short-term and long-term effects of parental illness on children's behavioral and educational functioning using data on junior high school students from Taiwan. He found that parental illness placed children at risk for behavioral problems, but their academic achievement and learning skills were resilient to the poor health of their parents.

The most recent evidence on the link between parental illness and child school performance comes from Europe. Bortes et al. (2020) investigated the effects of parental health problems on the probability of youths leaving upper secondary education before completion in Sweden. Using the population of individuals born between 1987 and 1990, the authors found that having had a parent with psychiatric (but not somatic) health problems necessitating hospitalization was associated with an increased probability of dropping out of secondary education. Kristiansen (2021) investigated the effects of parental health events on child mental health and educational outcomes using data on children born in Denmark between 1972 and 1998. To identify the causal effect, the author compared children experiencing the parental health

event shortly before a cut-off date (the school exam or application deadline for senior secondary schooling) to children who experienced the event shortly after the cut-off. She found that, following a parental health event, children were more likely to receive mental health therapy or consume anti-depressant medication, achieved lower test scores, and had lower school enrollment rates. Aaskoven et al. (2022) used a similar sample of Danish children, albeit those born between 1987 and 2000, to estimate the effect of parental onsets of cancer on children's school achievements, measured as grades and completion of secondary education. The authors employed the propensity score matching technique to control for potential endogeneity between parental health and children's school outcomes. They found that health shocks were associated with a significant reduction in children's school achievements. The study also established that the impact of parental cancer on children's school achievements increased with the severity of the health shock (as defined by statistical prognosis data independent of the cancer stage at the time of diagnosis) and that the effects were driven primarily by non-pecuniary costs of illness.

The educational outcomes of children may be influenced by the illness of their parents through a variety of complex and interconnected pathways. The illness of a parent can create disruptions in the family environment, leading to changes in family routines and responsibilities. This may result in reduced opportunities for parental stimulation of children's cognitive development, reduced support and monitoring of academic performance, and increased stress and anxiety for the children, ultimately impeding their ability to learn and excel in school. Moreover, parental illness can lead to changes in family structure, such as separation or divorce, which may further disrupt children's educational experiences. Lastly, the economic impact of parental illness can destabilize family finances and limit their ability to generate income.

Parental Illness and Disruptions in the Family Environment

Parents play a crucial role in their children's academic success. Parents create a home environment that encourages learning, provide access to educational opportunities and materials, communicate with teachers about their child's progress and academic needs, and act as role models who set expectations and aspirations that motivate children to strive for academic excellence (Dotterer, 2022). Numerous studies have established a positive link between parental involvement and children's academic achievement. For example, Steinberg et al. (1992) found that high school students who had a positive relationship with their parents and felt supported by them had better grades and attendance than those who reported a lower level of parental warmth and support. Kim (2022) conducted a comprehensive synthesis of academic publications exploring the correlation between parental involvement and academic achievement in school-age children (grades K-12). Her synthesis, which included a total of 23 meta-analyses and 1,177 primary studies, provides compelling evidence that there is a positive and significant association between parental involvement and academic achievement.

In a related strand of literature, scholars that narrowly focused on high school students found similar results. For example, Fehrmann et al. (1987) conducted a study with a sample of high school seniors selected from the first wave (1980) of the National Center for Education Statistics' High School and Beyond Longitudinal Study. They found that parental involvement was positively associated with their children's grades. James et al. (2019) investigated the relationship between parental home-based involvement and the GPA of children in high school across four ethnic groups: Asian American, African American, Hispanic American, and European American. Their study found that parental involvement was positively associated with subsequent GPA across all ethnic groups. Dotterer (2022) asserts that one of the principal

mechanisms through which parental involvement influences their children's academic achievement is by enhancing their children's self-efficacy. Thus, if the onset of chronic illness impedes parental involvement in their child's life, it would be expected to negatively affect children's academic development.

Research examining how parental illness impacts their involvement in children's lives and the psychological well-being of children and other family members is frequently situated within the framework of the family systems theory. This theoretical perspective conceptualizes the family as a set of interconnected individuals functioning in the context of the larger sociocultural system, with changes in one part of the system resulting in compensatory adjustments in other parts. The redistribution of functions and powers among family members occurs as the ill parent experiences a change or decline in functioning, necessitating adaptation within the family (Asen, 1985). For example, an illness in a family can lead to the adoption of new behaviors and coping mechanisms, such as role reversal, where children take on the role of caregivers for their ill parents (Aldridge & Becker, 1999; Davey et al., 2003; Johnston et al., 1992; Joseph et al., 2020).

In a recent policy report on the state of caregiving in the United States, Armstrong-Carter et al. (2021) reveal that 5.4 million children or adolescents under the age of 18 are providing care to family members who are aging or have a chronic illness, disability, or other health conditions that require assistance. Moreover, the authors reported that as many as 24% of middle school students and 16% of high school students provide some care to their families. Children and adolescents affected by changes in family dynamics as a result of parental illness may also assume additional domestic duties or responsibilities for caring for siblings (e.g., Grabiak et al., 2007). While caring for others is often considered a positive contributing factor to children's

social maturation, children of parents with chronic illness may find themselves overwhelmed by the responsibility of caring duties. Thus, although caregiving responsibilities may foster the development of competency and coping skills that help navigate stressors experienced in later lives, early parentification may also result in emotional distress and depression (Stein et al., 1999). In such cases, the developmental and schooling process of children may be compromised if the child lacks support from the non-ill parent (Johnston et al., 1992).

One of the more dramatic changes in the family environment brought about by parental illness is that of family breakup. Empirical research provides ample evidence of the association between poor health and divorce (Joung et al., 1998; Teachman, 2010; Wilson & Waddoups, 2002). The quality of relationships between the mother and the father is a strong correlate of children's educational outcomes. Compared with children from families where parents maintain their positive relationship and marriage, children with separated or divorced parents have a lower probability of obtaining a degree from secondary school, a higher probability of dropping out of school, and lower average grades compared to their peers from intact families (Björklund & Sundstrom, 2006; Brand et al., 2019; Keith & Finlay, 1988). According to a recent study conducted in Israel on Arab parents, the high school dropout rate for children from dissolved families was higher than that for children from intact families (Khaleel, 2022). Furthermore, research has shown that the absence of a father in the family has a more profound impact on children's high school graduation than the absence of a mother (McLanahan et al., 2013). The separation of families can also create financial stressors that may negatively impact children's educational attainment (Brand et al., 2019).

Parental Illness and Children's Psychological Distress

Empirical evidence on the impact of parental medical conditions on the psychological and emotional well-being of their children is inconsistent (Chen, 2016). Although a substantial amount of evidence supports the intuitive presumption that children of parents with chronic illness experience emotional, behavioral, and psychosocial problems (e.g., Pakenham & Cox, 2014; Tompkins & Wyatt, 2008), some studies (e.g., Jantzer et al., 2013; Razaz et al., 2016) indicate that children of chronically ill parents perform as well as, or even better than their peers who have healthy parents.

Based on a small sample of children of cancer patients at a New York City hospital, Siegel et al. (1992) were among the first researchers to report that children with terminally ill parents exhibited elevated levels of anxiety and depression, alongside diminished self-esteem and social competence. Similarly, based on semistructured interviews with 24 British adolescent children whose parents had cancer, Nelson et al. (1994) observed that some children exhibited difficulties and anxieties associated with their parent's diagnosis, leading to adverse academic effects, as well as disruptions to leisure activities, family lives, and relationships. Comparable findings were subsequently reported by other studies examining children whose parents were affected by cancer (e.g., Birenbaum et al., 1999; Heiney et al., 1997; Moller et al., 2014).

Studies examining parental health conditions other than cancer have also found evidence of children facing psychological challenges. For instance, Tompkins and Wyatt (2008) investigated 23 children (ages 9-16) of mothers infected with HIV. They observed a greater incidence of internalizing problems such as anxiety and depression, as well as externalizing problems (e.g., aggression) relative to children of non-infected mothers. Similarly, Pakenham and Cox (2014) reported that children residing in households with parents experiencing a broad

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range of physical or psychological health issues displayed more adverse mental health outcomes compared to children of healthy parents.

In contrast, some studies suggest that parental illness does not always have an unfavorable impact on the psychosocial functioning of adolescent children. Watson et al. (2006) interviewed mothers with breast cancer, their healthy partners, as well as their children's teachers. They obtained only a few reports that school-aged children whose mothers had breast cancer exhibited emotional or behavioral difficulties. Similarly, no differences regarding emotional or behavioral problems among children with an ill mother versus those without were found by Annunziato et al. (2007), who focused exclusively on single-mother families, or by Jantzer et al. (2013), who examined the role of empathy as the coping mechanism that allows children to adjust to an ill parent. Moreover, Razaz et al. (2016) documented that maternal onset of multiple sclerosis decreased the rates of negative child development outcomes. Bultmann et al. (2014) theorized that the positive outcomes resulting from the experience of parental illness could be attributed to the child's acquisition of a stronger appreciation for life and a heightened sense of personal resilience. However, no study has presented explicit evidence to support such a conclusion.

Several bibliographic reviews and meta-analyses attempted to shed light on the reasons for apparent differences in the extant evidence and reconcile the seemingly contradictory findings (Korneluk & Lee, 1998; Osborn, 2007; Phillips, 2014; Sieh et al., 2010). The authors of these analyses attribute the observed inconsistencies in the literature to variations in the measurement methods of children's adjustment and behavior across available studies and the difficulty in procuring homogenous and representative samples. For example, Korneluk and Lee (1998) note that children's self-reports often point to a heightened level of distress while parental

reports do not, indicating that parents may underestimate the distress experienced by their children due to parental illness. Overall, the meta-analyses infer that children of chronically ill parents tend to display significantly more internalizing problems (distress, anxiety, depression, etc.) when compared to children of healthy parents, and to a lesser degree, the externalizing, i.e., behavioral problems. Moreover, the authors of meta-analyses recommend that more studies, especially those based on large heterogeneous samples, are needed to reach clear conclusions about the relationships between specific aspects of parental illness and different areas of child functioning.

Parental Illness and Household Economic Status

Himmelstein et al. (2009) reported that medical expenses are the leading cause of personal bankruptcy in the United States. An illness of a family member can negatively impact a family's financial status primarily via two mechanisms. First, financial outlays may increase due to out-of-pocket healthcare expenditures as well as changes in non-healthcare spending on food, clothing, transport, or other health-related life adjustments (Babiarz et al., 2013; Smith, 1999, 2005). Second, an adverse health event can impact labor market participation. People in worse health might find it harder to work or be less productive at work, which would inhibit their capacity to earn income. Prinz et al. (2018) offer an excellent comprehensive review of the literature on the impact of health on economic activity over the lifecycle. Many studies show that some households are not fully insured against adverse health events and experience consumption cuts, debt acquisition, and/or depletion of savings when faced with an unexpected health shock (Adams et al., 2003; Babiarz & Yilmazer, 2017; Poterba et al., 2017; Wu, 2003).

There are several mechanisms through which household economic status can impact a child's high school performance. Firstly, financial constraints may restrict expenditures on

children (Bianchi et al., 2004), consequently impeding their development and long-term prospects (Duncan & Magnuson, 2005). Such constraints could also negatively impact a child's access to essential educational resources, including books, computers, and extracurricular activities. Secondly, economic hardship can lead to household stress, which can, in turn, affect parental involvement in their child's education and impact the child's mental health and well-being (as discussed above). Financial instability can also lead to housing instability or frequent moves, which can disrupt a child's education process. Finally, household economic status can also affect a child's nutrition, healthcare, and overall living conditions, which can, in turn, impact their physical and mental health and, subsequently, their academic performance.

Despite what we know about how parental illness impacts children's education, most studies that study the relationship between parental illness and the educational outcome of children use heterogeneous samples of children in different school grades. I test whether children whose parents experienced an onset of chronic illness before graduating high school have different overall Grade Point Averages relative to children whose parents have not experienced an onset of chronic illness before their children's high school graduation. The evidence on potential pathways to how parental health might affect the academic performance of their children appears to suggest that the onset of health adversities would lead to worse school performance. However, since some conceptual mechanisms reviewed above are ambiguous in terms of prediction of the direction of impact, my study aims to examine the said effects empirically.

Theoretical Perspective on the Effect of Parental Illness on Academic Performance

No single extant theoretical model could be used to form precise predictions or hypotheses of how the onset of parental illness could impact a child's academic performance.

However, several established theories can be used to frame the general discussion of such relationships. These theories help to organize and structure the empirical analysis, provide a roadmap for selecting relevant control variables, and identify potential mediators, i.e., the mechanisms through which parental illness may influence a child's academic performance. Moreover, discussing these theories facilitates the interpretation and generalizability of the findings presented later in my dissertation.

One of the most relevant theoretical frameworks is *Bowen's Family Systems Theory* (Bowen, 1978). This theory represents a comprehensive framework for understanding family dynamics and has established itself as a foundational concept in contemporary family therapy (Crossno, 2011). The theory encompasses reciprocal interactions among family members, providing insights into their interdependent functioning. Within this theoretical framework, family members seek attention, approval, and support from one another while also responding to each other's needs, expectations, and emotional disturbances. The effects of individual experiences within the family can impact other members both emotionally and behaviorally.

Bowen's theory comprises eight interlocking concepts, some of which help elucidate the functioning of family systems: differentiation of self, triangles, nuclear family emotional process, family projection process, multigenerational transmission process, emotional cutoff, sibling position, and societal emotional process. Differentiation of self refers to an individual's ability to maintain a sense of self while remaining emotionally connected to others. A higher level of differentiation allows individuals to navigate challenges and stressors more effectively. In the context of parental illness, a child with higher differentiation may be better equipped to manage the emotional impact of their parent's illness and make autonomous decisions regarding their educational goals and priorities. Conversely, children who are unable to separate their thoughts

and feelings from their parents may be more likely to experience emotional distress and may struggle academically as a result.

The concept of triangles describes the tendency for individuals to involve a third party when faced with relationship tension. In the context of parental illness, triangles may form between the child, the ill parent, and the other parent or a sibling. These triangles can influence the child's academic performance by creating emotional support from the third party or by turmoil and diverting their focus away from their educational pursuits. The nuclear family emotional process refers to the emotional patterns within the family unit, including reactivity and stability. When a parent becomes ill, it can disrupt the emotional climate of the family, leading to heightened reactivity and instability. This may create an environment that is less conducive to the child's academic success. Emotional cutoff, another concept in Bowen's theory, refers to strategies individuals use to distance themselves emotionally from family members. In the face of parental illness, a child may employ emotional cutoff as a means of managing the emotional intensity associated with their parent's condition. However, this emotional distancing can have negative repercussions on their academic performance, as it may limit access to emotional support and resources necessary for educational success.

The multigenerational transmission process examines the transmission of patterns and traits across generations within the family system. In the context of parental illness, the child may witness and internalize coping mechanisms, communication patterns, or emotional reactions that have been passed down through previous generations. These inherited patterns can shape the child's response to their parent's illness and subsequently impact their academic performance.

In conclusion, Bowen's theory of family systems and its associated concepts provide a useful framework for understanding the abstract mechanisms of the effects of parental illness on

a child's academic performance. It predicts that when a parent experiences illness, it can disrupt the balance and functioning of the entire family system. The stress and strain associated with the illness can lead to changes in family dynamics, including altered patterns of communication, role shifts, and increased levels of tension or anxiety. These changes may have both direct and indirect consequences for a child's academic performance, as they can impact the availability of emotional support, stability, and resources necessary for educational success.

Lazarus and Folkman's Transactional Model of Stress and Coping (Lazarus & Folkman, 1984) is another comprehensive theoretical framework that helps understand the mechanisms of how parental illness affects the academic performance of their children. This model emphasizes the dynamic and transactional nature of stress resulting from the continuous interplay between the individual and their environment and elucidates the cognitive and behavioral processes involved in coping with stressors. According to the model, stress is not solely determined by external events but is influenced by the individual's cognitive appraisal of those events. Primary appraisal involves evaluating the significance and meaning of a stressor, and determining whether it is perceived as a threat or a challenge. Secondary appraisal involves assessing the available resources and choosing coping strategies to manage the stressor. Coping strategies can be categorized as problem-focused (targeting the stressor itself) or emotion-focused (targeting the emotions associated with the stressor). The effectiveness of coping strategies is evaluated through ongoing feedback and adjustment.

An ill parent becomes a significant stressor for the child. According to the Transactional Model, the child engages in primary appraisal, which involves evaluating the significance and meaning of the parental illness. This appraisal process determines whether the child perceives the illness as a threat or a challenge to their academic performance. For instance, if the child views

the illness as a threat, they may experience heightened anxiety, which can negatively impact their ability to concentrate and perform academically. Conversely, if the child perceives the illness as a challenge, they may be motivated to overcome the difficulties and maintain their academic performance.

Secondary appraisal in the context of parental illness involves evaluating the available coping resources and determining the most appropriate coping strategies. Coping strategies can be categorized as problem-focused or emotion-focused. Problem-focused coping involves taking active steps to address the challenges associated with parental illness, such as seeking support from teachers, utilizing academic resources, or developing effective time management skills. Emotion-focused coping strategies, on the other hand, aim to regulate and manage the emotional distress caused by parental illness, such as seeking social support or engaging in relaxation techniques.

The Transactional Model underscores that the child's appraisal and coping responses are dynamic and can evolve as they gain new information and experiences related to parental illness. For example, as the child learns more about the illness, their appraisal may shift, leading to changes in their emotional and cognitive responses. Similarly, the effectiveness of coping strategies may vary, and the child may adapt their approach based on feedback and outcomes.

Yet another prominent theoretical model that could aid in the conceptual discussion of how the child's cognitive abilities and reasoning may be influenced by parental illness is *Piaget's Theory of Cognitive Development* (Ginsburg & Opper, 1988). This theory focuses on the cognitive processes and stages of development that individuals progress through as they acquire knowledge and understanding of the world. According to Piaget's theory, children progress through four main stages of cognitive development: the sensorimotor stage (birth to 2 years), the

preoperational stage (2 to 7 years), the concrete operational stage (7 to 11 years), and the formal operational stage (11 years and beyond). Each stage is characterized by specific cognitive abilities and ways of thinking. In the context of parental illness, the child's stage of cognitive development can shape their understanding of the illness, their ability to cope with the associated stressors, and their engagement in academic tasks. For instance, in the concrete operational stage, children develop the ability to think logically and engage in more complex problem-solving. However, they may struggle with abstract reasoning, which could affect their comprehension and performance in certain academic subjects. If a parent becomes ill during this stage, the child's cognitive development may be influenced by their understanding of the illness, such as comprehending the implications and potential limitations that the illness may impose on their parent's involvement in their education.

In the formal operational stage, adolescents are capable of abstract reasoning and hypothetical thinking. They can consider multiple perspectives and engage in more advanced cognitive processes. However, parental illness during this stage may introduce additional stressors that can potentially distract or undermine the adolescent's cognitive resources and focus. This, in turn, may affect their ability to concentrate, problem-solve, and maintain academic performance in high school.

In a relatively recent contribution to the literature on the conceptual modeling of the effects of parental illness on family functioning and youth well-being, Pedersen and Revenson (2005) reviewed the existing theoretical literature in developmental, clinical, and community psychology, as well as in family medicine, and formulated the *Family Ecology Framework.* This framework emphasizes the interconnectedness between the individual, the family, and the broader ecological systems in which they are embedded. At the individual level, the child's

academic performance may be influenced by their own characteristics, such as their cognitive abilities, motivation, and resilience. Parental illness can introduce additional stressors and challenges for the child, potentially affecting their academic engagement and performance. The child's ability to cope with these challenges, their perception of the illness, and their sense of self-efficacy may all play a role in shaping their academic outcomes. At the family level, parental illness can disrupt family dynamics, roles, and routines. The illness may necessitate adjustments in caregiving responsibilities, financial strain, and increased emotional stress within the family. These disruptions can have direct consequences on the child's academic performance, such as reduced parental involvement in their education or limited resources available for educational support. The broader ecological systems, such as the school environment and the community, also influence the child's academic performance. The school's response to parental illness, including the availability of support services and accommodations, can significantly impact the child's academic success. Community resources, such as access to healthcare or counseling services, can also play a role in mitigating the negative effects of parental illness on the child's academic performance.

While all theoretical frameworks mentioned above contribute to understanding how parental illness impacts a child's academic performance, they also highlight the complexity of the factors involved. Consequently, forming clear hypotheses and predictions about the direction and magnitude of these effects poses challenges. Nevertheless, given that most theoretical frameworks and empirical evidence reviewed above imply that parental illness should have a detrimental effect on a child's school performance, I hypothesize that children with chronically ill parents will attain lower high school GPAs compared to children with healthy parents. Furthermore, I expect that incorporating control variables into empirical tests to net out the effect

of some of the potential mechanisms of the effect of parental illness, i.e., the closeness of the parent-child relationship, parental marriage stability, or economic status of the family, will attenuate the magnitude of the correlation between parents health and child's school performance.

METHODOLOGY

The data for the empirical analysis is extracted from the 1999-2019 waves of the Panel Study Income Dynamics (PSID) and the 2005-2019 waves of the Transition to Adulthood Supplement (TAS). The PSID is a biennial longitudinal survey of American households that began in 1968. It contains detailed information about employment, finances, health, expenditures, socio-demographics, and numerous other topics. The TAS surveys children of PSID respondents when they are $18 - 28$ years old and collects detailed information on education, employment, family formation, health, and other aspects of the well-being of these young adults at the stage in their lives when they establish economic independence. Among other things, the TAS survey inquiries about the overall high school GPA at graduation.

I construct the estimation sample by matching young adult respondents from the TAS survey to their parents in the PSID survey. I focus on young adults whose both parents were alive at the time of high school graduation. To measure the impact of parental illness on their child's high school GPA, I estimate variants of the following cross-sectional regression model:

$$GPA_i = \alpha_1 C_i^{Mother} + \alpha_2 C_i^{Father} + X_i \beta + \varepsilon_i \tag{1}$$

where GPA_i measures the high school graduation grade point average of the i-th individual, C_i is a binary indicator for the onset of chronic health conditions experienced separately by each parent before the respondent completed high school, X_i is a vector of control variables, and ε_i is the error term assumed to be randomly distributed with a mean of zero. Parameters α_1 and α_2 are

identified based on comparisons of GPAs between students who encountered parental illness and those who did not experience such circumstances. Thus, the estimates of parameters α_1 and α_2 reveal the extent that high school GPA responded to parental health adversities, with negative point estimates implying that academic performance worsened as a result of the student's parents experiencing an onset of chronic illness.

The TAS survey enquires about the overall high school GPA and the upper limit of the grade scale used by the respondent's school. While most high schools use a 4-point grade scale, the scales may vary by school, and several sampled respondents report higher maximum possible GPA in their school (e.g., 5.0 or 12.0.) To improve the validity of comparisons of GPAs between respondents who attended schools with different scales, I convert the reported GPAs to the percentage scale (0-100) by dividing the GPA by the scale limit and multiplying the result by 100.

The question about high school GPA was asked in all TAS survey waves, implying that the measurement could be obtained from the first interview that an individual responded to after graduation or any subsequent interview for the duration of the respondent's participation in the study. As often observed in survey data, there are some measurement errors, i.e., discrepancies in the reported GPA between the survey waves. One approach to deal with this measurement error is to rely solely on the first reported GPA. Such a method could be justified under the assumption that the first interview after graduation is when the respondent best remembers their GPA reducing recall bias. However, the fact that GPAs reported in data waves immediately following graduation tend to be higher than GPAs reported in later waves suggests that some study participants might report a "harmless lie" and aspirational rather than an actual grade average. In

the absence of a mechanism to verify the correct GPA, I have opted to use the average of the GPAs reported over time for each student.

The PSID asks respondents a series of questions if they (and their spouses) were ever diagnosed by a doctor with any of the following health conditions: cancer, stroke, heart attack, heart disease, hypertension, diabetes, asthma, lung disease, arthritis, memory loss, learning disability, psychological conditions, or other conditions. Respondents who answered affirmatively were asked to report the age at which they were first diagnosed. By combining this information with data on the timing of high school graduation provided by TAS respondents, I have identified parental health conditions that emerged before high school completion. The precise information on dates, when students graduated from high school, is available in TAS data for the waves 2005-2015 only. Most students in the United States attend high school for four years (grades 9 through 12), and a child generally starts high school at the age of 14 and completes it at the age of 18. In the absence of information on dates when children started and finished high school (survey waves 2017 and 2019), I have assumed that students in my sample began high school in the year they turned 14 and completed it in the year they turned 18 without repeating any grade years.

I initially operationalize parental chronic illness variables as binary indicators equal to one if the parent reported that the first diagnosis of any of the aforementioned health conditions occurred before the child's high school graduation. However, since the magnitude of the effect of parental health adversities on children's school performance might differ by the type of health problem, I have categorized the identified illness into two categories: mental health and physical health. Mental health includes psychiatric, memory loss, or learning disability. Further, I have sub-categorized the physical illness as severe and mild. In medical sciences, the severity of

illness refers to the degree of physiological decompensation or the impairment of organ system function and is intended to estimate the amount of healthcare resources required to manage an individual patient's condition (Paulson et al., 2023). Based on this definition, cancer, stroke, heart attack, heart disease, and lung disease are classified as severe conditions, as these illnesses typically demand urgent and intensive medical interventions. Mild conditions comprise hypertension, diabetes, asthma, and arthritis. I re-estimate the model with health conditions grouped into three categories: (1) severe, (2) mild, and (3) mental. To test how the timing of diagnosis affects school performance, I repeat all analyses described above with indicators for onsets of health conditions experienced by each parent separately for conditions that were first diagnosed before the child started high school and conditions that were first diagnosed during high school years. Finally, to validate the robustness of my findings, I utilize the number of co-occurring chronic conditions experienced by each parent in the subsequent analysis as the proxy for the severity of health adversities. I include three mutually exclusive dummy variables for each parent in the estimations, representing the presence of (1) one health condition, (2) two or three conditions, and (3) four or more conditions. The reference category is the absence of any chronic condition. I also estimate Equation (1) with stand-alone indicators for each type of health condition.

The set of control variables X_i in the baseline model includes students' gender, race, parents' education, father's and mother's age at the time of graduation from high school, number of children in the household, and an indicator of the student's poor health at graduation. All estimations also include a set of high school graduation year dummies to control for the effect of time. Since a fraction of the sample (less than two percent) comprises students who graduated before 2005, I also include in all estimations an indicator of graduation before 2005. Some

schools in the United States use GPA calculation methods that give extra weight to advanced placement and honor classes. In such situations, students can report GPAs that seem to exceed the upper bound of the scale used by their school (one percent of the sample). I include a separate indicator variable to control for such an exceptionally high GPA.

To analyze the potential pathways of how parental illness affects a student's high school GPA, I also estimate augmented model specifications where the following additional variables are consecutively added to the regressions: the quality of each parent-child relationship at the end of high school, household net worth and income at the beginning of high school and the changes in those variables at the end of high school, and an indicator of parents being married to each other at the end of the high school.

All model specifications are estimated using the least squares regressions. Given the complex sample designs of the PSID and TAS surveys, the regressions are weighted with sample weights provided in public-release datasets. Taylor series linearization method is used to obtain consistent standard errors used for statistical inference. The size of estimation samples ranges between 1,359 and 1,697, depending on the availability of variables used in model specifications.

RESULTS

Table 1.1 presents the descriptive statistics for the whole estimation sample (n=1,677, column 1) and separately for the sub-samples of individuals with healthy parents (n=230, column 2), as well as those with at least one parent suffering from any chronic condition (n=1,447, column 3), a severe condition (n=531, column 4), and a mental condition (n=439, column 5). All descriptive statistics, as well as the subsequent estimations, are weighted using the PSID/TAS weights to be representative of the U.S. population of young adults. The average high school GPA measured on a percentage scale across the whole estimation sample is 83.18%. Young

adults with both parents in good health have a slightly higher average GPA of 84.32% compared to 82.99%, 82.93%, and 81.24% of those with at least one parent suffering from any health condition, a severe condition, and a mental health condition, respectively. Approximately 1.3% of the respondents in the sample have GPAs that exceed the reported scale limit, suggesting that they likely took honors or advanced placement (AP) classes in high school.

Among the sampled high school graduates, approximately 66% have a father and 65% have a mother who suffered from at least one health condition. Mild conditions are the most common, affecting around 62% of fathers and 58% of mothers. Severe conditions are experienced by approximately 19% of fathers and 18% of mothers. Mental health issues are the least prevalent, affecting about 12% of fathers and 17% of mothers.

In terms of demographic characteristics, the respondents are about evenly divided between males and females. Approximately 84% of sample participants identify as White, 8% as Black, and 8% as representing other races. Interestingly, when looking at sub-samples of young adults with an ill parent, it is observed that Whites were overrepresented, and Blacks are underrepresented relative to overall sample averages. The reasons for these differences are unclear, as they could have resulted from varying actual rates of diagnoses or unequal access to healthcare professionals who can provide accurate diagnoses. About 7% of the individuals in the sample report being in poor health, but this rate is nearly twice as high among those with parent(s) who suffer from mental illness.

On average, the sampled young adults have approximately one sibling under the age of 18 the in their household. The average education levels of both the father and mother in the full sample, as well as each subsample based on health status, range between 13 and 14 years. The average age of the father and mother at the time of their child's high school graduation is 49

years and 47 years, respectively. Understandably, the average parental age measured at the time of a child's high school graduation is slightly lower for individuals with healthy parents and slightly higher for those whose parents experienced health adversities. Around 90% of young adults have parents who were married to each other at the time of high school matriculation and this percentage decreased to 88% at graduation. However, among those whose parents experience mental illness, both numbers are approximately 8-9 percentage points lower.

The closeness of young adults' relationship to their fathers is rated, on average, at 72% on a scale of 0-100%, while the closeness with their mothers is rated at an average of 80%. These ratings are consistent across all sub-samples defined by parental health, except for the group of young adults with parents experiencing a mental illness. In this group, the closeness of the relationship with each parent is rated approximately 5 percentage points lower than the overall sample.

The average household income, measured in 2019 dollars, at the time of high school matriculation is $143K, and at high school completion, it is $150K. The average household net worth at the start of high school is $523K, and at the end of high school, it is $551K. Unsurprisingly, families where both parents are healthy had a noticeably higher financial status than families where at least one parent suffers from an illness, particularly if the health issue is mental.

The multivariate analysis involved estimating various variants of regression Equation (1) as described in the methodology section above. In the initial set of estimations, the percentage measure of high school GPA is regressed on indicator variables representing the father and mother being diagnosed with any adverse health condition before the child graduated from high school, along with a set of control variables. The estimation results for five model specifications

are presented in Table 1.2. Column 1 displays the estimation results for the parsimonious model, which includes basic demographic variables such as the student's sex, race, poor health status, number of school-age siblings, parents' education, parents' age at the time of the student's high school matriculation, marital status of parents at the time of high school matriculation, as well as household income and net worth at the beginning of high school. Subsequent models (columns 2-4) introduce additional control variables aimed to explore potential pathways through which parental illness may have impacted the high school GPA of their child. Column 2 considers the closeness of the student-parent relationship as a proxy for the amount of time each parent spends with the child. Column 3 examines parents' marital status at the time of high school graduation, and column 4 incorporates household income and net worth, also measured at graduation. By including these variables, I could assess if and how they altered the coefficient on parental illness and shed light on the underlying mechanisms at play. Finally, column 5 presents the results of the fully-specified model, which includes all covariates simultaneously.

The results presented in Table 1.2 do not provide evidence of a significant impact on a young adult's high school GPA when their father or mother was diagnosed with any one of the quoted health conditions before the child graduated from high school. Across all estimated models, the coefficient on the variable indicating a father's chronic health condition was positive but quantitatively small. The coefficient for the variable indicating a chronic condition of the mother was negative and larger in magnitude, suggesting that children of mothers with a chronic health condition may have graduated from high school with GPA lower by approximately 1 percentage point. However, none of these coefficients of interest is estimated with enough precision to achieve statistical significance or be generalizable to the overall population.

In terms of other covariates, females have a higher graduating GPA by approximately 4-5 percentage points compared to males. Black graduates have a GPA lower by about 6-7 percentage points compared to White respondents. Students who reported poor health have grades lower by about 3 percentage points compared to similar students who did not report poor health. Notably, students who took AP or honors classes have significantly higher GPAs, as indicated by the coefficient on GPA>100% variable. Among familial or parental characteristics, high school GPA is positively associated with the father's educational attainment and parents being married to each other at matriculation. Lastly, when controlling for family wealth at the beginning of high school, higher income measured in the same period shows a marginally significant negative correlation with GPA.

The impact of health conditions on academic performance can vary depending on their severity. The absence of statistically significant estimates mentioned above could be attributed to the fact that some health conditions observed in my sample may be relatively benign in terms of disruption to family operations. In the next stage of my analysis, I re-estimate the models with health conditions grouped based on their type and anticipated severity. Table 1.3 reveals that the experience of a severe health condition (i.e., cancer or a malignant tumor, stroke, lung diseases such as bronchitis or emphysema, coronary heart disease, angina, heart failure, or heart attack) by the mother before the child completed high school led to a statistically and quantitatively significant reduction in high school GPA, averaging slightly over 2 percentage points ($p<.05$). Likewise, the presence of mental illness (i.e., loss of memory or mental ability, emotional, nervous, or psychiatric problem, or learning disorder) in the mother has a quantitatively similar and statistically significant effect ($p<.05$). The impact of the mother's severe condition remains unchanged even after controlling for factors such as the closeness of the parent-child

relationship, parental marital status at graduation, and household income and net worth at graduation. However, the impact of the mother's mental condition becomes only marginally statistically significant (p<.1) with the inclusion of each of these covariates and becomes non-significant when all covariates are accounted for simultaneously. Nevertheless, the persistently negative effect and statistical significance of the mother's severe health adversity, even when all covariates are included simultaneously, suggests that none of the control variables effectively captures the potential pathways through which the effect operates. This indicates the presence of alternative potential pathways not addressed in this study (e.g., heightened stress inhibiting academic performance or time obligations detracting from study time).

To examine the timing and duration of parental health effects, Table 1.4 presents results from estimations where the variables measuring the onset of parental illness are divided into two periods: before the child entered high school and during the child's high school years. The onset of any health condition experienced by the mother before the child began high school is associated with a statistically significant reduction of 1.26 percentage points in the child's high school GPA compared to children with healthy parents. This effect remains significant at the 10% level even after controlling for the child's quality of relationship with parents, parental marital status, and household income and net worth at high school completion. However, the significance of the mother's illness onset diminishes when all covariates are included in the model at the same time.

In Table 1.5, the analyses further decompose the parental poor health indicators based on the timing of onset and illness severity. When the mother experiences severe illness or mental illness before the child enters high school, it results in a significant decrease in the child's high school GPA by 2.1 and 2.2 percentage points, respectively. Controlling for the child's

relationship closeness with both parents slightly attenuates the estimated effect of severe illness, rendering it marginally significant. However, controlling for relationship quality strengthens the estimated effect of maternal mental illness. In models accounting for parental marital status and household economic status at the time of high school graduation, the significance of both severe and mental health adversity remains consistent with the parsimonious model. This suggests that changes in marital status or family economic standing during high school are not the meaningful pathways of the impact of health conditions that occurred before the child started high school. Importantly, in the comprehensive model controlling for all covariates simultaneously, the estimated effect of severe and mental illnesses onset before the child entered high school on the child's high school GPA remains statistically significant and of similar magnitude. Again, this indicates that control variables such as the relationship closeness of the child to their parents, changes in parental marital status, or changes in family economic standing during high school do not fully capture the mechanism through which the mother's illness affects the child's high school GPA. Furthermore, the findings from Table 1.5 highlight that the effect of maternal illness on the child's high school GPA is enduring, as the health conditions that appear to exert a significant impact are those experienced before the child entered high school. The coefficient estimates for onsets of severe or mental health conditions in mothers that occur while the child is in high school are negative but relatively smaller in magnitude and not statistically significant.

Finally, given the arbitrary classification of health conditions as mild or severe in the estimations reported above, to validate the robustness of my findings, I utilize the number of co-occurring chronic conditions experienced by each parent in the subsequent analysis as the proxy for the severity of health adversities. I include three mutually exclusive dummy variables for each parent in the estimations, representing the presence of (1) one health condition, (2) two or

three conditions, and (3) four or more conditions. The reference category is the absence of any chronic condition. Table 1.6 presents the results of the estimations of these models. While no significant effect is observed for the father's condition, a monotonic relationship emerges between the mother's health status and the child's high school GPA, with a lower GPA associated with a higher number of co-occurring conditions. Although the effects associated with having one condition or two to three conditions do not reach statistical significance, the onset of four or more health conditions experienced by the mother before the child completed high school leads to a substantial decrease in the child's high school GPA by 5.31 percentage points. This effect is statistically significant at any reasonable significance level. Consistent with previous estimations, the significance and magnitude of this effect persists even after controlling for factors such as the child's closeness to parents, parental marital status at the completion of high school, and household income and net worth. Again, this pattern of findings indicates that mechanisms not measured in my data likely explain the impact of the mother's health on her child's high school GPA.

For interested readers, I have included detailed descriptive statistics and regression results in Appendix Tables 1.1 and 1.2. These tables provide itemized frequencies of onset for each type of condition diagnosis (Appendix Table 1.1) and demonstrate the effects of each condition on GPA while controlling for the onset of other health adversities (Appendix Table 1.2). However, I want to caution that careful inference should be exercised when interpreting these estimations due to the presence of multicollinearity issues resulting from the co-existence of many health conditions. Such multicollinearity can inflate the standard errors of coefficient estimates rendering the point estimates statistically non-significant. Among the health conditions, particularly those experienced by the mother, many coefficient estimates exhibit a negative sign.

However, only three conditions experienced by the mother (diabetes, cancer, learning disorder) are statistically significant negative correlates of high school GPA.

DISCUSSION AND CONCLUSION

High school grades have significant implications for college admissions, academic achievement in tertiary education, long-term financial success, and overall social well-being. In this research project, I have aimed to contribute to the existing literature on the factors influencing high school grades. I investigate the correlation between the onset of chronic illness experienced by parents before their child's high school graduation and the variation in the child's overall high school GPA. Utilizing data from multiple waves of the Panel Study of Income Dynamics and its Transition into Adulthood Supplement, I conducted a series of regression analyses to compare the GPAs of high school graduates with parents affected by chronic illness to those whose parents remained free from illness throughout the high school years.

My study did not produce convincing evidence indicating that health adversities experienced by fathers yield any observable impact on their children's academic performance. However, the findings do indicate that the onset of specific types of maternal illnesses detrimentally affects their children's high school grades. Precisely, a diagnosis of a severe health condition experienced by the mother (i.e., cancer, stroke, heart attack, heart disease, or lung disease) before the child's high school years is associated with an approximate decline of 2.1 percentage points in the GPA at graduation. Likewise, a diagnosis of a mental health issue experienced by the mother (i.e., memory loss or mental capacity decline, psychiatric problems, or learning disorders), is linked to a reduction of around 2.2 percentage points in the GPA.

Both estimates demonstrate robustness even when incorporating variables into the regression models that may serve as proxies for the underlying mechanisms through which the

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effect manifests. Specifically, I conducted tests to examine how the estimated impact of parental health changes when accounting for the following factors: (1) the self-reported closeness of the parent-child relationship, which can reflect the amount of time children spend with their parents and the caregiving responsibilities undertaken; (2) indicators of parental marital status at the beginning and end of high school, capturing potential disruptions to family composition arising from the illness; and (3) household income and net worth, measured at the start and conclusion of high school, to gauge illness-induced alterations in family economic circumstances. None of the modifications of the model meaningfully affected the estimated effect of maternal health on the child's GPA. This implies that a mechanism(s) not measured in the data, and unaccounted for in my empirical model, likely underlies the observed effect. Although not directly tested in this study, one plausible mechanism could be the psychological distress experienced by adolescent children when their parents face illness, or increased time spent on household chores, both of which could hamper their ability to engage in quality academic work.

One of the most intriguing discoveries in my study revolves around the timing and lasting impact of maternal health conditions. Interestingly, while the coefficients for the onsets of maternal health conditions during the child's high school years are negative, the precision of these parameter estimates in my models is insufficient to generalize them to the broader population. The significant effects of the mother's poor health observed in my data are actually linked to conditions that were diagnosed prior to the child's entry into high school. This implies that these health events carry enduring consequences for children.

My findings are broadly consistent with recent studies conducted by Kristiansen (2021) and Aaskoven et al. (2022), who utilized Danish data to illustrate the adverse influence of parental illness on the academic performance of middle and high school students. However,

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while these papers primarily described the immediate effects of parental illness on children's grades, my study highlights that high school grades of children in the United States are also affected by health shocks experienced before students entered high school. Certainly, further research is necessary to fully comprehend the underlying factors contributing to these differences. One potential explanation could lie in the institutional or other contextual factors that might help reconcile these discrepancies in findings. For instance, it is plausible that school professionals are attentive to the immediate repercussions of parental illness on students, implementing support systems to mitigate these impacts. It is worth noting that a significant proportion of public schools in the United States—more than half—already provide mental health diagnostic and counseling services (National Center for Education Statistics, 2022). However, schools may be less equipped to address the needs of students grappling with the lasting effects of parental health conditions that emerged before high school.

Shelton and Owens (2021) recognized the need to expand mental health services and other forms of student support in schools in order to ensure the delivery of effective and equitable quality education across different locations and segments of students. My analysis highlights the need for school professionals to be equipped with the requisite tools and training to identify and assist students who may be contending with the long-term consequences of maternal illnesses, even if these conditions materialized before the students' high school years. To this end, school-based support programs should be further enhanced to include tailored counseling services, academic support, and flexible attendance policies that can accommodate family circumstances. Effective communication between schools, families, and communities is also essential to bridge this gap and facilitate the identification of the specific needs of students with ill parents. Local communities can play a vital role in establishing support networks and

resources to assist families dealing with parental illness. These may include school-facilitated

local support groups, respite care services, and community-based organizations that assist with

various aspects of family life, including academic support for children.

Table 1.1

Descriptive Statistics (Means/Percentages)

	Whole sample (n=1,677)	Both parents healthy (n=230)	At least one parent with:		
			any condition (n=1,447)	a severe condition (n=531)	a mental condition (n=439)
GPA (0-100% scale)	83.18 %	84.32 %	82.99 %	82.93 %	81.24 %
Father with (any) health condition	66.05 %	0.00 %	77.45 %	88.95 %	82.92 %
Mother with (any) health condition	65.27 %	0.00 %	76.54 %	83.26 %	89.86 %
Type of father's health condition:					
Mild	62.22 %	0.00 %	72.96 %	79.44 %	76.61 %
Severe	18.58 %	0.00 %	21.78 %	58.01 %	26.68 %
Mental	11.69 %	0.00 %	13.71 %	16.86 %	48.63 %
Type of mother's health condition:					
Mild	58.46 %	0.00 %	68.55 %	68.87 %	75.73 %
Severe	18.21 %	0.00 %	21.35 %	56.86 %	23.89 %
Mental	16.77 %	0.00 %	19.67 %	21.26 %	69.78 %
Student's socio-demographics:					
Female	50.67 %	52.93 %	50.28 %	48.94 %	50.32 %
Race:					
White	84.01 %	82.19 %	84.33 %	85.09 %	88.09 %
Black	8.12 %	4.10 %	8.81 %	8.64 %	6.78 %
Other race	7.87 %	13.71 %	6.86 %	6.27 %	5.13 %
Poor health	7.44 %	7.69 %	7.39 %	6.96 %	13.26 %
GPA>100% (i.e., took AP or honors classes)	1.31 %	1.57 %	1.26 %	1.83 %	1.25 %
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.90	1.08	0.87	0.80	0.83
Father's # of years of educational attainment	13.6	13.0	13.7	13.8	13.5
Mother's # of years of educational attainment	13.5	13.1	13.5	13.7	13.3
Father's age at student's HS graduation	48.7	47.9	48.8	50.4	48.4
Mother's age at student's HS graduation	46.6	46.0	46.8	48.0	45.6
Parents married to each other at HS matriculation	90.19 %	91.60 %	89.95 %	89.23 %	82.05 %
Parents married to each other at HS graduation	88.24 %	89.66 %	87.99 %	87.27 %	79.47 %
Closeness to father (0-100% scale)	72.36 %	69.91 %	72.79 %	72.16 %	68.81 %
Closeness to mother (0-100% scale)	80.14 %	80.23 %	80.12 %	79.37 %	76.55 %
Household income at HS matriculation	$ 143,287	$ 177,374	$ 137,405	$ 148,329	$ 115,987
Household income at HS graduation	$ 150,083	$ 181,084	$ 144,734	$ 154,892	$ 123,458
Household net worth at HS matriculation	$ 523,002	$ 959,993	$ 447,592	$ 539,311	$ 336,466
Household net worth at HS graduation	$ 551,036	$ 950,759	$ 482,056	$ 617,671	$ 391,552
Year graduated HS:					
2002	3.86 %	3.57 %	3.91 %	4.67 %	4.60 %
2003	7.60 %	9.74 %	7.23 %	7.38 %	4.15 %
2004	9.98 %	10.75 %	9.85 %	8.66 %	9.62 %
2005	10.22 %	13.43 %	9.67 %	8.66 %	10.26 %
2006	8.51 %	7.22 %	8.74 %	8.30 %	10.08 %
2007	7.98 %	5.61 %	8.39 %	10.39 %	6.93 %
2008	7.94 %	8.65 %	7.82 %	8.34 %	7.78 %
2009	8.33 %	7.76 %	8.43 %	7.03 %	8.01 %
2010	5.28 %	3.58 %	5.57 %	5.73 %	5.51 %
2011	7.26 %	5.57 %	7.55 %	9.12 %	7.58 %
2012	3.54 %	2.95 %	3.64 %	4.26 %	3.61 %
2013	6.04 %	7.29 %	5.82 %	5.37 %	6.43 %
2014	3.82 %	5.00 %	3.62 %	2.74 %	3.15 %
2015	1.93 %	2.13 %	1.89 %	2.50 %	2.55 %
2016	2.58 %	2.80 %	2.55 %	2.54 %	3.77 %
2017	2.58 %	1.94 %	2.69 %	1.84 %	3.05 %
2018	1.16 %	0.31 %	1.31 %	1.00 %	1.57 %
2019	1.38 %	1.72 %	1.32 %	1.47 %	1.32 %

Notes: All numbers are weighted with PSID/TAS weights to be representative of the U.S. population. All dollar value variables (income, net worth) have been expressed in 2019 dollars (conversion using the Bureau of Labor Statistic's Consumer Price Index for All Urban Consumers, i.e., CPI-U). Some percentages may not add to 100 due to rounding.

Table 1.2

OLS Estimates of the Effects of (Any) Parental Health Conditions on GPA

	(1)	(2)	(3)	(4)	(5)
Dependent variable: high school grade point average measured on a 0-100% scale.					
Measures of parental health conditions:					
Father with (any) illness	0.312	0.306	0.340	0.353	0.356
Mother with (any) illness	-1.077	-0.984	-1.064	-1.014	-0.924
Student's socio-demographics:					
Female	4.529 ***	4.406 ***	4.497 ***	4.592 ***	4.449 ***
Black (ref: white)	-6.161 ***	-6.650 ***	-5.948 ***	-6.189 ***	-6.551 ***
Other race (ref: white)	-0.665	-0.780	-0.630	-0.547	-0.614
Poor health	-3.403 **	-3.291 *	-3.245 *	-3.232 *	-3.107 *
GPA>100% (i.e., took AP or honors classes)	32.384 ***	32.349 ***	32.467 ***	32.466 ***	32.476 ***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.681	0.657	0.673	0.685	0.655
Father's # of years of educational attainment	0.677 ***	0.674 ***	0.693 ***	0.689 ***	0.687 ***
Mother's # of years of educational attainment	0.118	0.117	0.119	0.108	0.112
Father's age at student's HS graduation	-0.034	-0.028	-0.040	-0.037	-0.036
Mother's age at student's HS graduation	0.171	0.173	0.174	0.157	0.163
Parents married to each other at HS matriculation	2.786 *	3.185 *	-1.291	2.693 *	0.328
Parents married to each other at HS graduation			4.257 *		2.872
Closeness to father		0.015			0.013
Closeness to mother		0.008			0.006
Arcsinh(household income at HS matriculation)	-1.036 †	-1.196 †	-1.082 †	-1.197 *	-1.356 *
Arcsinh(household income at HS graduation)				0.036	0.059
Arcsinh(household net worth at HS matriculation)	0.082	0.077	0.066	0.028	0.021
Arcsinh(household net worth at HS graduation)				0.125 †	0.108 †

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 1.3

OLS Estimates of the Effects of Parental Health Conditions on GPA by Illness Severity

	(1)	(2)	(3)	(4)	(5)
Dependent variable: high school grade point average measured on a 0-100% scale.					
Measures of parental health conditions:					
Father with mild illness	0.858	0.848	0.880	0.875	0.879
Father with severe illness	0.753	0.713	0.785	0.689	0.637
Father with mental illness	-1.060	-1.071	-1.110	-0.893	-0.968
Mother with mild illness	-0.193	-0.223	-0.171	-0.215	-0.216
Mother with severe illness	-2.229*	-2.267*	-2.281*	-2.088*	-2.181*
Mother with mental illness	-2.071*	-1.958†	-2.006†	-2.007†	-1.904
Student's socio-demographics:					
Female	4.490***	4.366***	4.456***	4.545***	4.397***
Black (ref: white)	-6.789***	-7.100***	-6.572***	-6.770***	-6.974***
Other race (ref: white)	-0.947	-1.100	-0.909	-0.839	-0.947
Poor health	-3.250**	-3.156*	-3.089*	-3.132*	-3.007*
GPA>100% (i.e., took AP or honors classes)	33.102***	33.035***	33.206***	33.117***	33.119***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.629*	0.597†	0.621*	0.636*	0.597†
Father's # of years of educational attainment	0.657***	0.652***	0.674***	0.667***	0.664***
Mother's # of years of educational attainment	0.132	0.133	0.133	0.122	0.128
Father's age at student's HS graduation	-0.035	-0.031	-0.041	-0.038	-0.039
Mother's age at student's HS graduation	0.152	0.161	0.155	0.143	0.155
Parents married to each other at HS matriculation	2.157†	2.673†	-2.007	2.118†	-0.277
Parents married to each other at HS graduation			4.345*		3.015
Closeness to father		0.012			0.010
Closeness to mother		0.004			0.003
Arcsinh(household income at HS matriculation)	-1.148†	-1.305†	-1.192†	-1.294*	-1.454*
Arcsinh(household income at HS graduation)				0.063	0.076
Arcsinh(household net worth at HS matriculation)	0.064	0.057	0.048	0.022	0.012
Arcsinh(household net worth at HS graduation)				0.099	0.085

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 1.4

OLS Estimates of the Effects of Parental Health Conditions on GPA by Illness Timing

	(1)	(2)	(3)	(4)	(5)
Dependent variable: high school grade point average measured on a 0-100% scale.					
Measures of parental health conditions:					
Father with (any) illness diagnosed before HS	0.196	0.111	0.216	0.285	0.200
Father with (any) illness diagnosed during HS	-0.356	-0.297	-0.398	-0.355	-0.316
Mother with (any) illness diagnosed before HS	-1.263†	-1.225†	-1.234†	-1.181†	-1.167
Mother with (any) illness diagnosed during HS	-0.119	0.161	-0.085	-0.001	0.234
Student's socio-demographics:					
Female	4.542***	4.306***	4.511***	4.614***	4.356***
Black (ref: white)	-4.877***	-5.473***	-4.672***	-4.896***	-5.400***
Other race (ref: white)	-1.108	-1.415	-1.070	-0.940	-1.232
Poor health	-3.174*	-2.654†	-3.032*	-2.966*	-2.501†
GPA>100% (i.e., took AP or honors classes)	26.889***	26.935***	26.978***	26.925***	26.979***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.957***	0.921**	0.950***	0.962***	0.924**
Father's # of years of educational attainment	0.647***	0.643***	0.663***	0.662***	0.652***
Mother's # of years of educational attainment	0.099	0.107	0.099	0.085	0.100
Father's age at student's HS graduation	0.020	0.030	0.016	0.016	0.024
Mother's age at student's HS graduation	0.143	0.163	0.146	0.125	0.149
Parents married to each other at HS matriculation	2.643*	2.791†	-1.067	2.564*	0.977
Parents married to each other at HS graduation			3.888*		1.809
Closeness to father		0.030†			0.028
Closeness to mother		0.019			0.018
Arcsinh(household income at HS matriculation)	-0.953†	-1.131†	-0.996†	-1.153*	-1.315*
Arcsinh(household income at HS graduation)				0.058	0.116
Arcsinh(household net worth at HS matriculation)	0.140**	0.123**	0.125*	0.075	0.068
Arcsinh(household net worth at HS graduation)				0.155**	0.112*

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 1.5

OLS Estimates of the Effects of Parental Health Conditions on GPA by the Illnesses Severity and

Timing

Dependent variable: high school grade point average measured on a 0-100% scale.					
	(1)	(2)	(3)	(4)	(5)
Measures of parental health conditions:					
Father with mild illness diagnosed before HS	0.747	0.778	0.776	0.782	0.839
Father with mild illness diagnosed during HS	0.065	0.138	0.020	0.070	0.117
Father with severe illness diagnosed before HS	0.421	0.222	0.441	0.359	0.146
Father with severe illness diagnosed during HS	1.587	1.598	1.622	1.506	1.531
Father with mental illness diagnosed before HS	-0.804	-0.800	-0.824	-0.663	-0.738
Father with mental illness diagnosed during HS	-1.525	-1.470	-1.638	-1.343	-1.396
Mother with mild illness diagnosed before HS	-0.366	-0.381	-0.345	-0.369	-0.381
Mother with mild illness diagnosed during HS	0.484	0.558	0.503	0.534	0.610
Mother with severe illness diagnosed before HS	-2.104 *	-1.951 †	-2.129 *	-2.015 *	-1.930 †
Mother with severe illness diagnosed during HS	-1.741	-1.841	-1.850	-1.504	-1.724
Mother with mental illness diagnosed before HS	-2.163 *	-2.308 *	-2.111 *	-2.100 *	-2.243 †
Mother with mental illness diagnosed during HS	-1.715	-1.131	-1.669	-1.716	-1.202
Student's socio-demographics:					
Female	4.509 ***	4.263 ***	4.477 ***	4.567 ***	4.285 ***
Black (ref: white)	-6.726 ***	-7.303 ***	-6.508 ***	-6.713 ***	-7.187 ***
Other race (ref: white)	-1.024	-1.216	-0.989	-0.907	-1.107
Poor health	-3.247 **	-2.810 *	-3.088 *	-3.123 *	-2.687 *
GPA>100% (i.e., took AP or honors classes)	33.091 ***	33.175 ***	33.176 ***	33.132 ***	33.255 ***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.637 *	0.584 †	0.629 *	0.643 *	0.583 †
Father's # of years of educational attainment	0.668 ***	0.665 ***	0.685 ***	0.678 ***	0.673 ***
Mother's # of years of educational attainment	0.132	0.147	0.133	0.122	0.143
Father's age at student's HS graduation	-0.036	-0.035	-0.041	-0.039	-0.042
Mother's age at student's HS graduation	0.152	0.181	0.154	0.142	0.176
Parents married to each other at HS matriculation	2.141 †	2.615 †	-2.068	2.095 †	-0.162
Parents married to each other at HS graduation			4.400 *		2.843
Closeness to father		0.016			0.014
Closeness to mother		0.007			0.006
Arcsinh(household income at HS matriculation)	-1.160 †	-1.339 *	-1.204 †	-1.303 *	-1.488 *
Arcsinh(household income at HS graduation)				0.059	0.106
Arcsinh(household net worth at HS matriculation)	0.064	0.037	0.048	0.021	0.001
Arcsinh(household net worth at HS graduation)				0.104	0.066

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 1.6

OLS Estimates of the Effects of Parental Health Conditions on GPA by the Number of Illnesses

Experienced

Dependent variable: high school grade point average measured on a 0-100% scale.					
	(1)	(2)	(3)	(4)	(5)
Measures of parental health conditions:					
Father with 1 condition (ref: healthy)	0.561	0.560	0.626	0.548	0.609
Father with 2-3 conditions (ref: healthy)	0.375	0.459	0.374	0.425	0.499
Father with 4+ conditions (ref: healthy)	1.264	1.044	1.283	1.268	1.007
Mother with 1 condition (ref: healthy)	-0.135	0.014	-0.129	-0.112	0.045
Mother with 2-3 conditions (ref: healthy)	-0.708	-0.639	-0.667	-0.696	-0.613
Mother with 4+ conditions (ref: healthy)	-5.316***	-5.498***	-5.311***	-5.135***	-5.348***
Student's socio-demographics:					
Female	4.493***	4.367***	4.461***	4.541***	4.393***
Black (ref: white)	-6.352***	-6.731***	-6.133***	-6.371***	-6.631***
Other race (ref: white)	-0.817	-0.946	-0.778	-0.729	-0.815
Poor health	-3.480**	-3.339*	-3.315**	-3.349**	-3.180*
GPA>100% (i.e., took AP or honors classes)	32.426***	32.327***	32.486***	32.557***	32.480***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.620*	0.587†	0.613*	0.621*	0.584†
Father's # of years of educational attainment	0.650***	0.640***	0.667***	0.661***	0.652***
Mother's # of years of educational attainment	0.129	0.132	0.130	0.119	0.126
Father's age at student's HS graduation	-0.009	-0.001	-0.015	-0.012	-0.008
Mother's age at student's HS graduation	0.172	0.179†	0.175†	0.162	0.172
Parents married to each other at HS matriculation	2.454†	2.808†	-1.770	2.400†	-0.108
Parents married to each other at HS graduation			4.403*		2.978†
Closeness to father		0.013			0.011
Closeness to mother		0.009			0.008
Arcsinh(household income at HS matriculation)	-1.230*	-1.398*	-1.277*	-1.362*	-1.542*
Arcsinh(household income at HS graduation)				0.050	0.071
Arcsinh(household net worth at HS matriculation)	0.040	0.032	0.024	-0.001	-0.012
Arcsinh(household net worth at HS graduation)				0.093	0.078

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Appendix 1.1

Detailed Descriptive Statistics on Health Conditions (Percentages)

	Whole sample (n=1,677)	At least one parent with:		
		any condition (n=1,447)	a severe condition (n=531)	a mental condition (n=439)
Type of father's health condition:				
Hypertension	35.88 %	41.99 %	51.23 %	40.58 %
Asthma	10.06 %	11.78 %	16.76 %	16.74 %
Diabetes	13.04 %	15.26 %	18.10 %	16.99 %
Arthritis or rheumatism	20.90 %	24.45 %	28.66 %	31.15 %
Lung disease (bronchitis, emphysema)	5.91 %	6.91 %	18.27 %	12.59 %
Stroke	1.81 %	2.12 %	5.59 %	3.41 %
Cancer or a malignant tumor	5.55 %	6.50 %	17.16 %	7.68 %
Heart attack	4.16 %	4.87 %	12.87 %	5.90 %
Coronary heart dis., angina, heart failure	7.30 %	8.54 %	22.57 %	9.73 %
Loss of memory or mental ability	1.29 %	1.51 %	3.17 %	5.19 %
Emotional, nervous, or psych. problem	9.48 %	11.09 %	14.16 %	38.02 %
Learning disorder	4.03 %	4.71 %	7.48 %	16.16 %
Other chronic condition	29.58 %	34.62 %	39.64 %	42.65 %
Type of mother's health condition:				
Hypertension	24.44 %	28.60 %	33.39 %	36.12 %
Asthma	12.56 %	14.70 %	19.86 %	19.73 %
Diabetes	9.29 %	10.87 %	13.47 %	16.77 %
Arthritis or rheumatism	21.32 %	24.95 %	30.95 %	38.11 %
Lung disease (bronchitis, emphysema)	5.61 %	6.57 %	17.35 %	12.72 %
Stroke	2.11 %	2.47 %	6.52 %	4.95 %
Cancer or a malignant tumor	9.05 %	10.59 %	27.98 %	8.79 %
Heart attack	1.11 %	1.30 %	3.44 %	2.35 %
Coronary heart dis., angina, heart failure	4.73 %	5.53 %	14.61 %	8.16 %
Loss of memory or mental ability	2.31 %	2.70 %	5.44 %	9.27 %
Emotional, nervous, or psych. problem	15.28 %	17.88 %	19.94 %	61.31 %
Learning disorder	3.02 %	3.53 %	5.61 %	12.10 %
Other chronic condition	33.55 %	39.25 %	43.82 %	56.01 %

Notes: All numbers are weighted with PSID/TAS weights to be representative of the U.S. population.

Appendix 1.2

OLS Estimates of the Effects of Parental Health Conditions on GPA by Type of Illness

	(1)	(2)	(3)	(4)	(5)
Dependent variable: high school grade point average measured on a 0-100% scale.					
Measures of parental health conditions:					
Father with hypertension	0.726	0.677	0.696	0.701	0.655
Father with asthma	0.695	0.861	0.698	0.768	0.835
Father with diabetes	0.484	0.355	0.560	0.493	0.372
Father with arthritis or rheumatism	-0.443	-0.795	-0.353	-0.442	-0.732
Father with lung disease (bronchitis, emphysema)	0.895	1.342	0.993	0.849	1.303
Father with stroke	1.560	0.958	1.667	1.606	1.037
Father with cancer or a malignant tumor	0.420	0.107	0.350	0.338	0.029
Father with heart attack	1.992	1.470	1.892	1.918	1.447
Father with coronary heart dis., angina, heart failure	0.055	0.237	0.101	0.027	0.187
Father with loss of memory or mental ability	-0.480	0.582	-0.507	-0.468	0.526
Father with emotional, nervous, or psych. problem	-0.524	-0.500	-0.519	-0.474	-0.467
Father with learning disorder	-1.756	-1.472	-1.930	-1.588	-1.426
Father with other chronic condition	0.296	0.517	0.264	0.310	0.513
Mother with hypertension	-0.292	0.089	-0.259	-0.312	0.086
Mother with asthma	-1.008	-1.336	-1.132	-0.946	-1.337
Mother with diabetes	-3.604 ***	-3.927 ***	-3.739 ***	-3.585 ***	-4.012 ***
Mother with arthritis or rheumatism	0.003	-0.110	-0.032	0.009	-0.121
Mother with lung disease (bronchitis, emphysema)	-0.987	-0.296	-1.091	-0.767	-0.232
Mother with stroke	-0.868	-0.946	-0.952	-0.931	-0.993
Mother with cancer or a malignant tumor	-2.562 *	-2.707 †	-2.605 *	-2.468 †	-2.653 †
Mother with heart attack	-4.249	-3.637	-4.455	-3.980	-3.569
Mother with coronary heart dis., angina, heart failure	-0.328	-1.166	-0.244	-0.339	-1.095
Mother with loss of memory or mental ability	-0.621	-2.031	-0.814	-0.667	-2.147
Mother with emotional, nervous, or psych. problem	-0.581	-0.342	-0.492	-0.537	-0.300
Mother with learning disorder	-4.211 †	-5.271 *	-3.914 †	-4.215 †	-5.054 *
Mother with other chronic condition	-0.215	-0.416	-0.159	-0.200	-0.346
Student's socio-demographics:					
Female	4.460 ***	4.367 ***	4.433 ***	4.502 ***	4.386 ***
Black (ref: white)	-6.384 ***	-6.603 ***	-6.120 ***	-6.370 ***	-6.459 ***
Other race (ref: white)	-1.277	-1.504	-1.258	-1.181	-1.389
Poor health	-3.074 *	-2.948 *	-2.909 *	-2.975 *	-2.825 *
GPA>100% (i.e., took AP or honors classes)	32.907 ***	32.886 ***	33.034 ***	32.924 ***	32.984 ***
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.575 †	0.521	0.561 †	0.581 †	0.517
Father's # of years of educational attainment	0.640 ***	0.644 ***	0.654 ***	0.651 ***	0.655 ***
Mother's # of years of educational attainment	0.115	0.114	0.117	0.106	0.110
Father's age at student's HS graduation	-0.031	-0.020	-0.038	-0.034	-0.029
Mother's age at student's HS graduation	0.163	0.168	0.167	0.157	0.166
Parents married to each other at HS matriculation	2.363 †	2.893 †	-2.275	2.341 †	-0.199
Parents married to each other at HS graduation			4.853 **		3.184
Closeness to father		0.013			0.011
Closeness to mother		0.007			0.005
Arcsinh(household income at HS matriculation)	-1.344 *	-1.551 *	-1.381 *	-1.450 *	-1.642 *
Arcsinh(household income at HS graduation)				0.034	0.035
Arcsinh(household net worth at HS matriculation)	0.065	0.057	0.046	0.032	0.024
Arcsinh(household net worth at HS graduation)				0.079	0.058

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression

estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

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CHAPTER 3

ESSAY 2: THE EFFECT OF PARENTAL ILLNESS ON CHILDREN'S TERTIARY

EDUCATION: COLLEGE ENROLLMENT AND COMPLETION EXPECTATIONS

INTRODUCTION

Numerous studies have demonstrated that individuals with a college degree tend to enjoy better employment prospects, higher earning potential, more opportunities for prestigious careers, and personal growth and development (Barrow & Malamud, 2015; Oreopoulos & Petronijevic, 2013; Riddell & Song, 2011). In 2020, full-time workers in the United States aged 25 to 34 with a bachelor's degree earned a median income of $59,600, which was 63 percent higher than the median income of $36,600 for those who attained a high school diploma as their highest degree (Irwin et al., 2022).

Despite the extensive body of research attesting to the benefits of college education, a sizable portion of high school graduates choose not to pursue college. According to the most recent annual report published by the National Center for Education Statistics (2022), only about 63 percent of high school graduates enrolled in college in 2020. The report states that 43 percent of graduates enrolled in four-year institutions, and 20 percent enrolled in two-year institutions immediately after completing high school. Moreover, the report notes that the immediate college enrollment rate (i.e., the percentage of graduates who enroll in college immediately after completing high school) declined from 68 to 63 percent between 2010 and 2020.

The declining rates of college enrollment among high school graduates and the consequent loss of tertiary education benefits necessitate inquiries regarding the underlying factors driving college enrollment decisions. The stylized facts presented above imply that college enrollment decisions can have broad social and economic impacts on income inequality, social mobility, and the changing nature of work in the 21st century. Understanding factors that influence college enrollment decisions can help policymakers and educators develop effective strategies to increase college attendance rates and support students' academic success. The purpose of this essay is to contribute to the literature on the determinants of college attendance by measuring the association between the onset of parental illness and two tertiary education-related outcomes measured for the child before reaching the age of twenty-one: (1) the actual college enrollment and (2) the expectation of graduation.

In the following section, I review the relevant literature on the determinants of transition from secondary-level education to college, along with the empirical evidence on the conceptual mechanisms underlying the association of parental illness with college attendance and the expectation of completion. Subsequently, I discuss the study methodology, encompassing the empirical model, data sources, and measurement of variables.

LITERATURE REVIEW

The literature on the determinants of college enrollment is extensive. Factors that influence this decision-making process can be broadly classified into several intertwined categories, including personal, familial, economic, and miscellaneous factors (Chenoweth & Galliher, 2004; Han, 2014; Park & Hossler, 2014). Personal factors include individual characteristics such as race or ethnicity, gender, intelligence/cognitive abilities, high school grades, or standardized test scores. Familial factors include family economic status, parental

education level, health of family members, or family structure. Examples of economic factors include the cost of college, availability of financial aid, or access to student loans. Finally, college attendance decisions might also be influenced by miscellaneous variables such as college location and size, academic programs, campus climate, culture, or even sentiments toward school athletics. In the following sub-sections, I provide a succinct review of the relevant strands of literature on the determinants of college enrollment, focusing specifically on the mechanisms that may explain the association between parental illness and college attendance decisions and expectations of graduation.

Parental Illness and Educational Outcomes of Young Adults

As highlighted in the previous essay, the literature examining the influence of parental illness on educational outcomes among adolescents and young adults is scarce and inconclusive, with most studies centering on the primary and secondary stages of educational attainment and outcome measures such as behavioral problems, school dropout rates, or academic performance measured as GPA or test scores (e.g., Aaskoven et al., 2022; Bortes et al., 2020; Bratti & Mendola, 2014; Chen, 2012).

Studies linking parental illness specifically to college attendance are scarce, and, to the best of my knowledge, only a couple of papers researched this relationship with a sample of U.S. families. Boardman et al. (2012) used data from the National Longitudinal Study of Adolescent Health and compared the educational attainment of adults who had relatively unhealthy parents when they were adolescents to those whose parents were healthy during this stage of their lives. They reported that adolescents whose parents described their health as "fair" or "poor" were more likely to drop out of high school compared to those whose parents reported better levels of health. At the same time, no meaningful association between parental health and the likelihood

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of attending college among those who graduated from high school was observed. The authors did show, however, that among college attendees, completing college was more likely among those whose parents reported better health when they were adolescents. Johnson and Reynolds (2013) used data from the National Longitudinal Study of Youth to investigate the impact of week-long hospitalizations of household members on educational attainment among youth. Their findings indicated that having a household member hospitalized during adolescence was associated with a significant decrease in the probability of college enrollment, completing a bachelor's degree, and an increase in the probability of dropping out of high school. Furthermore, the study found that birth order and the gender composition of siblings played a role, with stronger negative effects measured among male respondents and oldest siblings.

A few studies have explored the effect of parental illness on tertiary educational outcomes of children utilizing samples of respondents from outside the United States. Choi (2011) examined the effect of parental health crises occurring in prime working years on the subsequent educational attainment and working status of adult children using Russia Longitudinal Monitoring Survey data for the period 1994–2004. Results indicated that a father's poor health status was associated with a reduced likelihood of his daughter's tertiary education and employment. Bratti and Mendola (2014) used longitudinal data from Bosnia and Herzegovina and found that co-living children of ill mothers, but not fathers, were less likely to be enrolled in formal educational institutions at ages 15–24. Mendolia et al. (2019) investigated the impact of maternal illness on children's education and employment outcomes in Vietnam and found that a mother's poor health substantially decreased the chances of being enrolled in secondary or tertiary school and increased the likelihood of entering the labor market, particularly for girls. Finally, Bortes et al. (2020) examined the impact of parental illness on

educational attainment among youths and young adults in Sweden and found that onsets of psychiatric illnesses (but not somatic illnesses) experienced by parents increased the probability of leaving upper secondary education before degree completion.

Conceptual Pathways of the Effect of Parental Illness on College Enrollment and Completion Expectations

The logical pathways through which parental illness can affect the decision of their children to attend college and the expectation of graduation are similar to the conceptual mechanisms reviewed in the previous essay, i.e., those that explain how parents' health affects the academic performance of their children in high school. First, parents' poor health can lead to emotional strain or time constraints on other family members. For instance, when a parent becomes ill, children may need to take on additional responsibilities to help care for their parents or younger siblings (Grabiak et al., 2007). This added responsibility could make it difficult for them to balance academic workload with familial obligations, leading young adults to prioritize family responsibilities over educational pursuits. Additionally, an ill parent may not be able to provide the same level of emotional support and guidance to their children during the college enrollment decision-making process, which can make it more challenging for their children to navigate the complexities of the application and financing process. In a survey conducted by Esters (2007), students indicated that parents, especially mothers, had the most influence on their decisions to enroll in a postsecondary education program. Another mechanism is the economic strain that an illness can inflict on a household. If a parent becomes ill, they may have to reduce work hours or stop working altogether, resulting in a loss of income or depletion of savings. The loss of income can make it difficult for the family to afford the costs associated with college (Baek & Song, 2021; Rowan-Kenyon et al., 2008). For a more in-depth review of empirical

evidence regarding these mechanisms, the reader is referred to the previous essay on the effect of parental illness on high school performance.

Another crucial factor that influences adolescents' decision to attend college and the subsequent enrollment status is high school GPA. Grades can serve as a predictor of academic potential and preparedness for college-level coursework (Sawyer, 2013). Students with high GPAs are more attractive candidates to colleges and universities, increasing their chances of being accepted. Additionally, high school GPAs can determine eligibility for merit-based scholarships and placement in higher-level courses, which can help students graduate on time and pursue more advanced coursework. High school GPAs are positively associated with college persistence and graduation rates (Peltier et al., 2000). Finally, research shows that high school GPA is a strong predictor of young adults' tertiary educational attainment and earnings. French et al. (2015) analyzed data from multiple waves of the National Longitudinal Survey of Adolescent Health and found that a 1-point increase in high school GPA doubles the probability of completing college, from 21 percent to 42 percent, for both genders. Furthermore, an equivalent increase in high school GPA is associated with an estimated 11.85 percent increase in annual earnings for males and a 13.77 percent increase for females in adulthood. Given the above, the effect of parental illness on high school GPA documented in Essay 1 constitutes an important conceptual mechanism for how parents' health affects college enrollment and completion expectations.

Educational expectations and aspirations stand out as yet another crucial determinant of the decision of whether or not to pursue post-secondary education, often outpacing other typical predictors, despite their reduced power in recent years (Jacob & Wilder, 2010). Although these terms are often used interchangeably in the literature, they have distinct meanings. Educational

expectations refer to what individuals think will happen, while educational aspirations refer to what individuals hope will happen in terms of their highest level of education to be attained in the future (Gorard et al., 2012; Mickelson, 1990). Educational expectations are based on a rational assessment of the costs and benefits of pursuing education and are subject to continuous adjustment based on updated information (Morgan, 1998). Students with higher educational expectations in high school tend to achieve higher levels of education compared to their peers with lower expectations, regardless of their academic performance. (Bozick et al., 2010; Cowan, 2018; Eccles et al., 2004; Hearn, 1991; Khattab, 2015; Villarreal et al., 2015). Moreover, students with lower academic achievement but high educational expectations are more likely to enroll in post-secondary education than their counterparts with high academic achievement but lower educational expectations (Bates & Anderson, 2014). Unexpected parental illness may augment students' expectations of completing college, suggesting that appraisal and adjustment of educational expectations offer an additional pathway to understanding how parental health affects college enrollment.

Other Family-Related Determinants of College Enrollment and Completion Expectations

The literature on the determinants of college enrollment is too extensive to be comprehensively reviewed here. However, some key factors merit consideration as they may confound the effect of parental illness on tertiary educational outcomes. Parental education, especially maternal education, is a significant predictor of positive cognitive and behavioral outcomes in young children (Harding, 2015), as well as increased access to educational opportunities and early childhood education (Crosnoe et al., 2021). Further, parental education can have a lasting impact on children's lives beyond their early years. For example, in the Columbia County Longitudinal Study, 856 third-graders in a semi-rural New York State county

were surveyed in 1960, and their educational and occupational success was subsequently tracked at ages 19, 30, and 48. The study found that the "parents' educational level when the child was eight years old significantly predicted educational and occupational success for the child 40 years later" (Dubow, 2009, p. 224).

Maternal age is another important factor that has been linked to children's educational attainment. Addo et al. (2016) analyzed data from the Children and Young Adult sample of the 1979 National Longitudinal Survey of Youth and noted that children of mothers aged 25 or younger faced considerable disadvantages compared to those born to older mothers. Further, Fishman and Min (2018) found a curvilinear relationship between maternal age and children's educational attainment. By analyzing data from Waves 1 (1995) and 4 (2007–2008) of the National Longitudinal Study of Adolescent to Adult Health, they concluded that children born when their mothers were between 31 and 40 had the highest educational attainment compared to other maternal age groups.

The stability of the family environment in which children grow up has been shown to impact their educational attainment. When children experience repeated changes in family structure, it can negatively affect their ability to enroll and complete college (Fomby, 2013). Compared to children living with one biological parent and a stepparent, children living with both biological parents receive greater parental financial support to attend college (Henretta et al., 2012). However, maintaining relationships with nonresident fathers and building strong bonds with stepfathers are associated with positive educational outcomes (King et al., 2019).

The theoretical and empirical evidence reviewed above suggests that coping with parental illness will have a detrimental effect on their children's academic outcomes. Therefore, my empirical investigations aim to confirm two hypotheses. First, I predict that children with

chronically ill parents will have lower odds of college enrollment at the age of 21 or younger. Second, I predicted that children aged 21 or younger with chronically ill parents will report lower expectations of completing a 4-years college than the otherwise identical respondents with healthy parents. Moreover, similarly to Essay 1, I expect that the impacts of parental illness on both outcome variables will be attenuated when variables that control for effect pathways are included in estimaitons as control variables.

METHODOLOGY

Similar to the previous study, the data for empirical analyses are extracted from the 1999-2019 waves of the Panel Study Income Dynamics (PSID) and the 2005-2019 waves of the Transition to Adulthood Supplement (TAS). The estimation sample is again constructed by matching young adult participants from the TAS survey to their parents-respondents to the PSID survey. Also, as before, to create a more homogeneous sample, I focus on young adults whose parents were both alive at the time of high school completion. In the current essay, I analyze two educational outcomes measured in the years imminently following high school graduation: (1) the anticipated completion of a four-year college and (2) the actual enrollment in a four-year college program by the age of 21 years.

Students typically complete their high school education by the age of 18 or 19, with the majority graduating by the age of 20 (Bowlby & McMullen, 2002). Consequently, modeling the probability of college enrollment at the age of 21 years or younger ensures that all participants had at least one year to consider post-secondary education. This approach captures the entire population at a stage when they had ample time to decide on college enrollment. Further, turning 21 signifies a transition from youth to legal adulthood, granting individuals legal rights such as

voting and purchasing alcohol. As such, focusing on the age of 21 when analyzing college enrollment can offer valuable insights into the educational pathways of young adults.

To measure the impact of parental illness on these outcomes, I estimate variants of the following logistic regression model:

$$\log\left(\frac{p_i}{1 - p_i}\right) = \gamma_1 C_i^{Mother} + \gamma_2 C_i^{Father} + X_i \delta \tag{2}$$

Logistic regression is a statistical technique that models the relationship between a binary dependent variable and one or more independent variables. Unlike linear regression, which assumes a normal distribution of the dependent variable, logistic regression transforms the dependent variable into the logarithm of odds. This transformation guarantees that the predicted probabilities will fall within the 0-1 range. Logistic regression model parameters are estimated using the maximum likelihood method, which involves finding the values of the model coefficients that maximize the likelihood of the observed data given the model. As a result, as can be observed in Equation (2) above, logistic regression does not include an error term in its model specification since the probability distribution used in the estimation already accounted for the random variation in the dependent variable. In Equation (2), p_i is the probability of observing the binary educational outcome for the i-th young adult, C_i^{Mother} and C_i^{Father} are binary indicators for the onset of chronic health conditions experienced by each parent, respectively, before the respondent completed high school and X_i is a vector of control variables. The parameters of interest are γ_1 and γ_2. The exponentiated estimate values of these parameters reveal how onsets of parental health adversities affect the odds of observing the modeled educational outcomes.

The first dependent variable indicates the expectation of completing a 4-year college, measured during the first survey interview after completing high school and when the respondent

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was not above the age of 21 years. I operationalize this variable by utilizing the response to the following TAS survey question: "How far do you think you will actually go in school?". Respondents indicated their anticipated level of education by choosing from the following set of possible answers: (1) "graduate high school", (2) "graduate from a two-year community college", (3) "earn a specialized certificate from a vocational or trade school", (4) "attend a 4-year college", (5) "graduate from a 4-year college", (6) "get more than 4 years of college", and (7) "do something else" (8) "don't know" and (9) "NA; refused." I code the anticipated 4-year college completion variable as "1" if the response falls into categories 5 or 6, and "0" otherwise. Thus, my estimations aim to analyze how parental illness affects the expectation of graduating from a 4-year program at a college or university. Each wave of the TAS survey also asks if the respondents have ever attended college. Combining the answer to this survey question with the respondent's age, I construct my second binary dependent variable that indicates actual enrollment in a 4-years college at the age of 21 or younger. I use this variable in model specifications designed to study the impact of parental illness on young adults' enrollment in a 4-years college at the age of 21 years or younger.

The parental chronic illness variables are operationalized as in the previous chapter. Also, similar to the previous essay, I first estimate the effect of the onset of any of the health conditions. Next, I estimate the differential effects of the onset of severe, mild, and mental health on the outcome variables. Finally, to assess the effect of the timing of diagnosis on the school performance, I repeat all analyses described above with indicators for onsets of health conditions experienced by each parent separately for conditions that were first diagnosed before the child started high school and conditions that were first diagnosed during high school years. I further estimate the effect of co-occurring health conditions by including three mutually exclusive

dummy variables for each parent in the estimations, representing the presence of (1) one health condition, (2) two or three conditions, and (3) four or more conditions. Lastly, I also estimate the effect on the outcome variables of each of the individual health conditions separately.

Similar to the study of high school GPA from the previous chapter, the baseline model includes the following control variables: students' gender, race, parents' education, father's and mother's age at the time of graduation from high school, number of children in the household, and an indicator of the student's poor health at graduation, high school graduation year dummies and an indicator of graduation before 2005. Additionally, the baseline model also controls for high school GPA. I use the average of the GPAs reported over time for each student.

To analyze the potential pathways of how parental illness affects a student's high school GPA, I also estimate augmented model specifications where the following additional variables are consecutively added to the logistic regressions: the quality of each parent-child relationship at the end of high school, household net worth and income at the end of high school, and an indicator of parents being married to each other at the end of the high school.

RESULTS

Table 2.1 presents the descriptive statistics for the estimation sample. Analogously to Study 1, the numbers are arranged into five columns: the whole sample (n=1,752), individuals with healthy parents (n=236), individuals with at least one parent suffering from any chronic condition (n=1,516), individuals with at least one parent with a severe condition (n=561), and individuals with a parent who suffers from a mental condition (n=476). To ensure that the descriptive statistics are representative of the U.S. population of young adults, all estimates are weighted using the PSID/TAS weights.

Among the sampled respondents, 82% enrolled in college at the age of 21 or younger.

Young adults from households with both parents in good health exhibit a higher college

enrollment rate (84%) compared to those from households where at least one parent has a health

condition (82%), a severe condition (79%), or a mental condition (70%). Regarding college

completion expectations, 75% of the sampled high school graduates aged 21 or younger

anticipated completing a 4-year college or pursuing graduate education. However, the percentage

drops to 67% for young adults from households where at least one parent had a mental health

condition. In comparison, the percentages are nearly 76% for those with healthy parents, 76% for

those in households where at least one parent had any health condition, and 75% for those where

at least one parent copes with a severe condition.

About 66% of both fathers and mothers of the sampled young adults have experienced at

least one health condition. Among fathers, 62% have a mild health condition, 19% have a severe

health condition and 12% have a mental condition. For mothers, 59% have a mild health

condition, 19% have a severe health condition, and 18% have a mental condition. Regarding the

demographics of the sampled high school graduates, 50% are females, 84% are White,

approximately 8% are Black, and approximately 8% represent other races. Slightly less than 8%

of the sampled individuals report being in poor health. The average high school GPA of young

adults measured on a percentage scale is 83%.

In terms of familial characteristics, on average, young adults have approximately one

sibling under the age of 18 in the household. The average education levels of both fathers and

mothers are slightly above 13 years each. The average age of the father and mother at the time

of the young adult's high school graduation is close to 49 years and 47 years, respectively.

Around 88% of young adults have parents who are married to each other at the end of high

school. Young adults rate the closeness to their fathers, on average, at 72% and the closeness to their mothers at 80% on a scale of 0-100%. At the completion of high school, the average household income is $147K, and the average household net worth is $536K (both variables measured in 2019 dollars).

There are few differences in demographic and socioeconomic descriptors between sub-groups in the sample when comparing respondents with healthy parents and those with parents experiencing chronic health issues. However, notable exceptions include a lower proportion of parents married to each other in households where at least one parent has a mental health issue. Respondents with a mentally ill parent also rate their relationship closeness with their parents lower compared to other groups, and these families tend to have lower income and net worth.

I analyze college enrollment as the first outcome variable. Tables 2.2a through 2.2e report odds ratios estimated by various specifications of logistic regression models. The dependent variable in these models is equal to one for the young adults who answered in the affirmative to the question of whether they were enrolled in college at the age of 21 or younger, and zero otherwise. The independent variables include parental health conditions, along with varying sets of control variables: a parsimonious model with basic demographic and socio-economic controls (column 1), a model that adds high school GPA as a control (column 2), a model that accounts for child-parent relationship closeness (column 3), a model considering changes in marital status during high school (column 4), a model incorporating changes in family income and net worth during high school (column 5), and a comprehensive model including all covariates simultaneously (column 6).

The results in Table 2.2a indicate that the diagnosis of any of the surveyed health conditions in either the father or the mother before the child's high school graduation does not

significantly affect the odds of the child enrolling in college. The estimates of odds ratios for parental health variables are all below one, implying a negative association between parental health adversities and their child's college enrollment. However, none of the effects are statistically significant at conventional significance levels. Regarding other covariates, female respondents exhibit higher odds of college enrollment compared to males when they are 21 years old or younger. In terms of race, Black individuals are less likely to enroll, while individuals from other racial backgrounds show higher odds of college enrollment when compared to Whites. Poor health exerts a statistically significant and quantitatively substantial negative impact on the odds of attending college, while high school GPA emerges as a significant positive predictor of this outcome. Among familial characteristics, young adults with school-age siblings demonstrate a higher likelihood of enrolling in college. Additionally, parental educational attainment and the mother's age at the time of the respondent's high school graduation are positively associated with the odds of college enrollment. As expected, higher household income and net worth are also positively correlated with college enrollment.

In Table 2.2b, when parental health conditions are operationalized based on type and severity, the estimations detect a marginally significant (p<.1) negative impact of the severe health condition experienced by the mother on the odds of the child enrolling in college at age 21 or younger. The effect size suggests that when the mother is diagnosed with a severe health condition, the odds of her child enrolling in college decrease by approximately 28%. However, this effect becomes statistically non-significant when controlling for potential pathways such as changes in high school GPA, the quality of the child-parent relationship, parents' marital status, or the family's economic situation. This indicates that these factors each contribute to explaining why children of sick mothers are less likely to enroll in college at a young age. Further, the onset

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of the mother's mental illness is found to reduce the odds of college enrollment at the age of 21 or younger by about 56%. This effect weakens but remains significant when controlling for high school GPA and household economic variables. When all covariates are accounted for in the model, the effect is further attenuated but still significant at the 5% level, implying that, when the mother is diagnosed with a mental illness, the odds of her child enrolling in college at age 21 or younger are lower by about 44% even adjusting for the impact that the illness exerts on high school GPA, quality of the parent-child relationship, parental marital status, and the family's economic standing.

In Table 2.2c, the parental illness indicators are decomposed into two periods based on the timing of the onset of the health condition: before the child entered high school and during the child's high school years. None of the effects are significant in any of the models except for a negative estimate when the father was diagnosed with an illness before the child entered high school in the model that controls for baseline characteristics and high school GPA. However, considering that this effect is not observed in the parsimonious model and disappears when accounting for other potential mechanisms, it is likely to be a spurious estimate rather than reliable evidence of a significant impact of the father's poor health.

In Table 2.2d, the analyses examine the effects of parental illness by considering severity, type, and the timing of onset. Results suggest a potential long-term impact of the father's severe illness that was diagnosed before the child entered high school, which is associated with a nearly 36% reduction in the odds of the child enrolling in college at the age of 21 or younger. When controlling for high school GPA, the magnitude and significance of this effect increase. However, adding controls for closeness to parents and household economic variables at the completion of high school weakens the effect and renders it non-significant. Lastly, in the model

that controls for all potential pathways, the odds of enrolling in college at the age of 21 or younger are still lower by 47% and remain significant at the 10% level. The onset of the mother's mental illness before the child entered high school is associated with a significant reduction of almost 39% in the odds of the child enrolling in college by the age of 21 or younger. However, the introduction of pathway control variables, particularly high school GPA, largely attenuates this effect, suggesting that GPA plays a key role in mediating the impact. In contrast, when the mother's mental illness is diagnosed during the child's high school years, the effects on college enrollment are robust and substantial, with odds decreasing by approximately 72% and remaining statistically significant at the 5% level. Even after controlling for the potential pathways, the effect size remains strong, suggesting that unexamined mechanisms may explain how a mother's mental health influences her child's likelihood of college attendance.

In Table 2.2e, the estimation results are presented for models that operationalize parental health conditions based on the number of illnesses experienced by each parent. As anticipated, when the mother experiences 4 or more concurrent health conditions before the child completes high school, the odds of the child enrolling in college at the age of 21 or younger decrease by 58%, and the effect is significant at the 1% level. Consistent with previous findings, the inclusion of additional covariates attenuates the effect, with high school GPA appearing to play a prominent role as a mediating pathway. Each covariate serves as a proxy for different pathways through which the effect operates, and when all potential pathways are accounted for in the model, the statistical significance of the effect diminishes completely.

Similar to Study 1, an appendix (Appendix 2.1) is included, providing detailed frequency distribution information on the health conditions experienced by each parent. Additionally, a table is presented (Appendix Table 2.2a), showing regression results when controlling for each

type of diagnosed health condition separately. It is important to interpret these results with caution due to the presence of multicollinearity resulting from the co-occurrence of multiple conditions. Notably, health conditions such as father's heart disease, learning disorder, mother's heart attack or other heart diseases, as well as loss of memory/mental capacity or psychiatric problems, show statistically significant negative correlations with the odds of attending college at age 21 or younger.

In the next stage, I conduct the multivariate analyses of the second outcome variable, i.e., the expectation of 4-year college completion. Tables 2.3a through 2.3e report the odds ratios obtained by estimating various logistic regression specifications. In these models, the dependent variable is coded as one for respondents who, in their last interview at the age of 21 or younger, expressed an expectation to complete 4-year college or pursue graduate education, and zero otherwise. The format and structure of the tables mirror those used for the previous analysis of college enrollment.

Results in Table 2.3a do not reveal any significant influence of the father's or the mother's poor health on the young adults' expectations of completing a tertiary education degree. The odds ratio for the father experiencing any illness before the child completed high school is approximately 1. The odds ratios for the mother experiencing any illness before the child completed high school are below 1, but none of the estimates are statistically significant. Several covariates were found to be statistically significant correlates of the expectation of college completion. Compared to White respondents, Blacks exhibit lower odds, while individuals from other races demonstrate higher odds of anticipating completing a 4-year college. Additionally, respondents in poor health had lower odds of expecting college completion, while those with better-educated or more affluent parents exhibit higher odds.

When parental health events are operationalized based on type/severity (Table 2.3b), the estimations detect marginally significant negative impacts of the onset of both severe and mental health conditions experienced by the mother. Specifically, when the mother is diagnosed with a severe health condition, her child's expectations of completing a 4-year college decrease by 23%. Similarly, the onset of a mental health issue in the mother leads to a 29% decrease in her child's college completion expectations. Both effects vanish when controls for high school GPA, the quality of child-parent relationships, and the family's economic status are added to the model. This suggests that these factors serve as important mediators in explaining the influence of the mother's health on her child's college completion expectations.

Results presented in Table 2.3c largely confirm that the mother's health adversities have a significant impact on their child's expectation of college completion, while the health events experienced by the father do not show a significant effect. These results also highlight that it is not the onset of health conditions that are experienced by the mother during the child's high school years that influence college expectations, but rather the conditions diagnosed before the child entered high school. The effect size is notable, as the onset of any chronic illness before the child entered high school decreases the odds of reporting an expectation of college completion by a young adult by approximately 27%. This effect becomes non-significant when controlling for high school GPA and household economic variables, suggesting again that changes in these variables serve as mechanisms through which the effect operates.

In Table 2.3d., the analyses further decompose the illness variables based on severity and timing. In contrast to the results reported above, none of the coefficients of interest are significant in these analyses. However, it is worth noting that most of the estimated odds ratios for health variables align with expectations as they are lower than one indicating negative

correlations between the onset of adverse health events and college completion expectations. The lack of statistical significance might be attributed to the relatively small sample sizes within each group defined by combinations of health condition severity/type and timing, which poses challenges for the precise identification of the investigated effects.

The results of the robustness check in Table 2.3e align with the earlier findings regarding college enrollment. Children whose mothers experience 4 or more concurrent health conditions before the child completes high school have significantly lower odds (57% lower) of expecting to attain a college education compared to children of healthy mothers. Although the effect is partially attenuated when controlling for variables such as high school GPA and household economic factors, even after considering all covariates, the odds of anticipating college completion remain lower by approximately 45% among children of mothers with 4 or more health conditions compared to children of healthy mothers (significant at the level of 10%).

Appendix 2.2b presents odds ratios obtained from logistic regressions when all of the itemized parental illnesses variables are included as separate covariates. Consistent with expectations, most of the results demonstrate a negative association between the onsets of health adversities and expectations of college completion. However, there are a few estimates that deviate from the expected direction. As before, it is important to note that since each of the illness variables is controlled separately in estimations, there is a possibility of multicollinearity due to the co-occurrence of certain health conditions. Therefore, caution should be exercised when interpreting these results.

DISCUSSION AND CONCLUSION

The acquisition of a college degree is a crucial factor for both personal and professional development across various spheres of life. In an era marked by rapid technological

advancements and ever-evolving labor markets, a college education equips individuals with a comprehensive repertoire of skills and knowledge essential for navigating the intricacies of the modern world. College graduates enjoy enhanced prospects of attaining lucrative employment, making meaningful contributions to innovation and research, and actively participating in civic affairs. Furthermore, a college degree acts as a catalyst for social mobility, empowering individuals from disadvantaged backgrounds and diminishing socioeconomic inequalities.

In this research project, I aimed to contribute to the growing body of literature concerning the factors that influence individuals' decisions to pursue higher education. By utilizing data from multiple waves of the Panel Study of Income Dynamics and its Transition into Adulthood Supplement, I conducted a series of logistic regression analyses to explore the impact of parental chronic illness onset on two aspects of a child's college education: (1) the decision to enroll in college and (2) the expectation of completing a four-year degree program.

My research indicates that variables representing any parental illness occurring before high school graduation have limited explanatory power regarding college enrollment by the age of 21, as well as expectations of obtaining a 4-year college degree. However, this does not imply that the history of parental illness is irrelevant to tertiary education outcomes. By conducting analyses that specifically isolate the influence of more severe health conditions (such as cancer, stroke, heart attack, heart disease, or lung disease) or mental illnesses (including memory loss, mental capacity decline, psychiatric problems, or learning disorders), I have identified statistically significant and quantitatively sizable negative effects of maternal illness observed in relation to both college enrollment and the expectation of attaining a college degree. Moreover, my analyses have unveiled that the adverse effects of a mother's poor health are somewhat mitigated when accounting for high school GPA, and to a lesser extent, the changes in the

family's economic situation caused by illness. These findings complement and expand upon the results of Study 1, which found a detrimental impact of a mother's illness on high school GPA. Additionally, I have determined that the closeness of the parent-child relationship or the marital status of the family are not the mechanisms through which a mother's health exerts its effects. Furthermore, a considerable portion of the effect remains unexplained in my models, suggesting the presence of additional mechanisms. These mechanisms could potentially involve changes in the student's psychological state or time commitments.

I conducted a nuanced estimation similar to Study 1, aiming to provide further insights into the timing and persistence of parental health effects. However, the results of these estimations yielded fewer conclusive findings and insights compared to Study 1. Regarding the impact of severe physical maternal illness on college enrollment, it appears that severe maternal illnesses occurring before high school matriculation have a stronger effect than those experienced during the school years. However, both estimates lack the precision required for statistical significance. In contrast, the onset of maternal mental illness, whether before the child entered high school or during their high school years, exhibits statistically significant effects. The impact of maternal mental illness occurring before high school is diminished when controlling for high school GPA, indicating that high school performance serves as the primary pathway through which this effect operates. Conversely, the effect of maternal mental illness during the child's high school years remains unaffected by the inclusion of any pathway control variables, suggesting the presence of a third mechanism responsible for this effect. With regards to the second outcome variable, i.e., the college completion expectation, the breakdown of maternal illness by the timing of onset implies that onsets before high school are more influential. However, estimations that further break down the condition onset variables by

severity and timing fail to confirm this finding, possibly due to the small number of respondents in groups defined by combinations of these independent variable categories. Furthermore, unlike in Study 1, in the present study, I discovered that the onset of severe illness experienced by the father before the child entered high school has a similar detrimental effect on the odds of college enrollment as an equivalent condition experienced by the mother. Unlike the mother's illness, the effect of the father's illness is not mitigated by controlling for high school GPA.

In line with the conclusions drawn in Study 1, my research findings in the present study highlight the importance of acknowledging and addressing the distinct challenges faced by young adults who have chronically ill parents, particularly mothers experiencing severe illness or mental health issues. To effectively support high school students and young adults navigating parental illnesses who are at the cusp of making college application decisions, it would be advantageous to establish tailored guidelines and resources for educators and school professionals. Ensuring easy access to information about psychological and financial assistance can also provide valuable support to these vulnerable students.

Some online resources for high school graduates encourage applicants with chronically ill parents to share the challenges they encounter due to their unique familial circumstances as many colleges and universities might factor that into admissions decisions (for example, see: https://www.cappex.com/articles/applications/tell-admissions-officers-about-difficult-family-situations). Although there is no academic literature that would attest to the effectiveness of such application strategy, the findings of my study indicate that admission officials should perhaps consider these applications favorably. After all, it is difficult to come up with examples of more justifiable circumstances when a college application should be viewed favorably than the hardship created by parental illness. Thus, a potential strategy to encourage college enrollment

among students with chronically ill parents could involve educating both students and parents about the benefits of communicating their stories to university admissions officers. It may be necessary to equip admissions officers with rigorous scientific evidence on how to appropriately respond to and why to support these applicants. Such an approach could counterbalance the negative impacts of parental illness, particularly if these effects operate via high school GPA and household economic circumstances. Nevertheless, this proposition necessitates further empirical research for validation.

Table 2.1

Descriptive Statistics (Means/Percentages)

	Whole sample (n=1,752)	Both parents healthy (n=236)	At least one parent with:		
			any condition (n=1,516)	a severe condition (n=561)	a mental condition (n=476)
Enrolled at any college at 21 years old or younger	82.30 %	83.77 %	82.05 %	79.28 %	70.40 %
Expects to graduate from a 4-year college (measured 21 or younger)	74.51 %	75.85 %	74.28 %	75.12 %	66.60 %
Father with (any) health condition	65.78 %	0.00 %	76.97 %	88.47 %	82.36 %
Mother with (any) health condition	65.78 %	0.00 %	76.97 %	83.84 %	90.49 %
Type of father's health condition:					
Mild	61.96 %	0.00 %	72.50 %	79.22 %	76.18 %
Severe	18.69 %	0.00 %	21.87 %	57.80 %	27.32 %
Mental	11.99 %	0.00 %	14.03 %	18.01 %	48.09 %
Type of mother's health condition:					
Mild	59.02 %	0.00 %	69.06 %	69.70 %	76.88 %
Severe	18.68 %	0.00 %	21.86 %	57.76 %	25.44 %
Mental	17.66 %	0.00 %	20.67 %	23.04 %	70.85 %
Student's socio-demographics:					
Female	50.49 %	53.62 %	49.95 %	47.86 %	49.97 %
Race:					
White	84.03 %	81.32 %	84.50 %	85.53 %	88.08 %
Black	8.46 %	5.47 %	8.97 %	8.63 %	6.96 %
Other race	7.51 %	13.21 %	6.54 %	5.84 %	4.96 %
Poor health	7.86 %	9.37 %	7.60 %	7.41 %	12.43 %
GPA (0-100% scale)	83.21 %	84.34 %	83.02 %	82.97 %	81.21 %
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.89	1.08	0.86	0.78	0.80
Father's # of years of educational attainment	13.6	13.0	13.7	13.7	13.4
Mother's # of years of educational attainment	13.4	13.0	13.5	13.7	13.2
Father's age at student's HS graduation	48.7	47.8	48.8	50.2	48.4
Mother's age at student's HS graduation	46.6	46.1	46.7	47.8	45.7
Parents married to each other at HS graduation	87.50 %	89.67 %	87.13 %	86.67 %	78.27 %
Closeness to father (0-100% scale)	72.19 %	70.38 %	72.50 %	71.88 %	68.47 %
Closeness to mother (0-100% scale)	80.13 %	80.23 %	80.12 %	79.48 %	76.41 %
Household income at HS graduation	$ 147,183	$ 176,945	$ 142,119	$ 151,218	$ 119,843
Household net worth at HS graduation	$ 536,213	$ 923,741	$ 470,271	$ 602,047	$ 366,227
Year graduated HS:					
2002	3.72 %	3.44 %	3.77 %	4.43 %	4.23 %
2003	7.72 %	9.86 %	7.35 %	7.35 %	4.28 %
2004	9.91 %	10.37 %	9.84 %	8.76 %	9.62 %
2005	10.37 %	14.54 %	9.67 %	8.59 %	9.46 %
2006	8.52 %	7.69 %	8.66 %	7.86 %	10.10 %
2007	8.12 %	5.76 %	8.52 %	10.55 %	7.07 %
2008	8.09 %	8.35 %	8.04 %	8.77 %	8.38 %
2009	8.05 %	7.49 %	8.15 %	6.52 %	7.76 %
2010	5.69 %	4.31 %	5.92 %	6.47 %	6.85 %
2011	7.13 %	5.38 %	7.42 %	9.24 %	7.67 %
2012	3.64 %	2.85 %	3.78 %	4.50 %	3.32 %
2013	5.92 %	7.03 %	5.73 %	5.25 %	6.29 %
2014	3.76 %	5.08 %	3.54 %	2.59 %	3.04 %
2015	2.04 %	2.05 %	2.03 %	2.72 %	2.47 %
2016	2.64 %	2.70 %	2.63 %	2.46 %	3.88 %
2017	2.59 %	1.87 %	2.71 %	1.87 %	3.23 %
2018	1.08 %	0.34 %	1.20 %	0.81 %	1.49 %
2019	1.01 %	0.91 %	1.03 %	1.25 %	0.86 %

Notes: All numbers are weighted with PSID/TAS weights to be representative of the U.S. population. All dollar value variables (income, net worth) have been expressed in 2019 dollars (conversion using the Bureau of Labor Statistic's Consumer Price Index for All Urban Consumers, i.e., CPI-U). Some percentages may not add to 100 due to rounding.

Table 2.2a

Logistic Regression Odds Ratios of the Effects of (any) Parental Health Conditions on College

Enrollment at Age 21 or Younger

Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with (any) illness	0.777	0.722	0.796	0.760	0.788	0.755
Mother with (any) illness	0.908	0.951	0.947	0.942	0.995	1.077
Student's socio-demographics:						
Female	1.592*	1.375	1.552*	1.613*	1.840**	1.538 †
Black (ref: white)	0.407***	0.546*	0.470**	0.463**	0.563*	0.860
Other race (ref: white)	2.559***	2.215**	2.658**	2.489***	2.544***	2.449**
Poor health	0.423**	0.477*	0.436*	0.438*	0.481*	0.480*
HS GPA (0-100% scale)		1.039***				1.041***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.258*	1.154	1.296*	1.215†	1.282*	1.216 †
Father's # of years of educational attainment	1.174**	1.124**	1.173**	1.180***	1.112*	1.064
Mother's # of years of educational attainment	1.065*	1.076*	1.068*	1.061*	1.033	1.050 †
Father's age at student's HS graduation	0.984	1.002	0.986	0.985	0.986	1.015
Mother's age at student's HS graduation	1.093**	1.085*	1.096**	1.084*	1.070*	1.057
Parents married to each other at HS graduation				1.774**		1.071
Closeness to father			1.005			1.000
Closeness to mother			1.004			1.003
Arcsinh(household income at HS graduation)					1.763**	1.777**
Arcsinh(household net worth at HS graduation)					1.043***	1.040***

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.2b

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on College

Enrollment at Age 21 or Younger by Illness Severity

Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with mild illness	0.977	0.861	1.020	0.960	0.954	0.895
Father with severe illness	0.836	0.823	0.873	0.819	0.824	0.860
Father with mental illness	0.741	0.804	0.646	0.753	0.908	0.802
Mother with mild illness	1.010	0.997	1.044	1.011	1.001	1.027
Mother with severe illness	0.724 †	0.863	0.750	0.734	0.787	0.908
Mother with mental illness	0.441 ***	0.513 **	0.439 ***	0.465 ***	0.509 **	0.563 *
Student's socio-demographics:						
Female	1.602 *	1.408	1.589 *	1.615 *	1.829 **	1.572 †
Black (ref: white)	0.366 ***	0.515 *	0.426 **	0.403 ***	0.500 **	0.802
Other race (ref: white)	2.196 **	1.984 **	2.309 **	2.175 **	2.268 **	2.245 **
Poor health	0.470 *	0.530 *	0.475 *	0.482 *	0.516 *	0.527 †
HS GPA (0-100% scale)		1.037 ***				1.040 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.227 *	1.147	1.258 *	1.199 †	1.255 *	1.207 †
Father's # of years of educational attainment	1.165 ***	1.125 **	1.163 **	1.170 ***	1.116 *	1.074 †
Mother's # of years of educational attainment	1.066 *	1.073 *	1.072 *	1.064 *	1.036	1.052
Father's age at student's HS graduation	0.987	1.010	0.990	0.988	0.987	1.018
Mother's age at student's HS graduation	1.079 *	1.071 *	1.082 *	1.073 *	1.064 *	1.051
Parents married to each other at HS graduation				1.477 †		1.002
Closeness to father			1.004			1.000
Closeness to mother			1.002			1.001
Arcsinh(household income at HS graduation)					1.618 **	1.601 *
Arcsinh(household net worth at HS graduation)					1.038 **	1.037 **

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.2c

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on College

Enrollment at Age 21 or Younger by Illness Timing

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
Measures of parental health conditions:						
Father with (any) illness diagnosed before HS	0.735	0.675 *	0.756	0.724	0.780	0.723
Father with (any) illness diagnosed during HS	1.010	0.967	0.944	0.983	1.041	0.926
Mother with (any) illness diagnosed before HS	0.835	0.918	0.838	0.872	0.880	0.975
Mother with (any) illness diagnosed during HS	0.774	0.747	0.779	0.790	0.873	0.808
Student's socio-demographics:						
Female	1.546 *	1.337	1.490 †	1.561 *	1.772 **	1.478
Black (ref: white)	0.467 **	0.610 †	0.566 *	0.537 *	0.658 †	1.069
Other race (ref: white)	2.361 ***	1.986 **	2.443 **	2.297 ***	2.349 ***	2.166 *
Poor health	0.424 *	0.470 *	0.440 *	0.437 *	0.481 *	0.477 *
HS GPA (0-100% scale)		1.038 ***				1.040 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.339 **	1.228 †	1.400 **	1.291 *	1.372 **	1.317 *
Father's # of years of educational attainment	1.176 **	1.125 **	1.175 **	1.182 **	1.113 *	1.067
Mother's # of years of educational attainment	1.064 *	1.075 *	1.069 *	1.061 *	1.033	1.051 †
Father's age at student's HS graduation	0.997	1.018	1.002	0.998	0.999	1.036
Mother's age at student's HS graduation	1.084 **	1.076 *	1.087 **	1.075 *	1.062 *	1.045
Parents married to each other at HS graduation				1.820 **		1.161
Closeness to father			1.006			1.001
Closeness to mother			1.005			1.004
Arcsinh(household income at HS graduation)					1.760 **	1.764 **
Arcsinh(household net worth at HS graduation)					1.042 ***	1.038 **

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.2d

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on College

Enrollment at Age 21 or Younger by Illness Severity and Timing

Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with mild illness diagnosed before HS	0.854	0.756	0.876	0.847	0.870	0.781
Father with mild illness diagnosed during HS	1.052	1.006	1.063	1.038	1.047	1.010
Father with severe illness diagnosed before HS	0.641 †	0.522 *	0.683	0.629 †	0.622	0.535 †
Father with severe illness diagnosed during HS	1.376	1.930	1.427	1.334	1.330	1.983
Father with mental illness diagnosed before HS	0.708	0.797	0.619	0.729	0.829	0.758
Father with mental illness diagnosed during HS	0.841	0.894	0.697	0.807	1.113	0.926
Mother with mild illness diagnosed before HS	0.888	0.914	0.877	0.893	0.892	0.934
Mother with mild illness diagnosed during HS	1.107	1.044	1.168	1.113	1.158	1.119
Mother with severe illness diagnosed before HS	0.714	0.859	0.775	0.730	0.756	0.934
Mother with severe illness diagnosed during HS	0.884	1.006	0.920	0.881	0.997	1.010
Mother with mental illness diagnosed before HS	0.614 *	0.783	0.646 †	0.648 †	0.688 †	0.915
Mother with mental illness diagnosed during HS	0.279 **	0.258 **	0.254 ***	0.289 **	0.327 **	0.265 ***
Student's socio-demographics:						
Female	1.596 *	1.373	1.581 *	1.611 *	1.809 **	1.504 †
Black (ref: white)	0.395 ***	0.566 *	0.462 **	0.435 **	0.531 **	0.889
Other race (ref: white)	2.053 **	1.813 *	2.157 *	2.030 **	2.129 **	2.020 *
Poor health	0.459 *	0.500 *	0.464 *	0.467 *	0.505 *	0.493 *
HS GPA (0-100% scale)		1.038 ***				1.042 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.225 *	1.151	1.254 *	1.197 †	1.256 *	1.209 †
Father's # of years of educational attainment	1.168 ***	1.124 **	1.165 **	1.172 ***	1.120 *	1.076 *
Mother's # of years of educational attainment	1.064 *	1.069 *	1.069 *	1.061 *	1.033	1.046
Father's age at student's HS graduation	0.988	1.012	0.991	0.989	0.987	1.019
Mother's age at student's HS graduation	1.078 *	1.072 *	1.082 *	1.073 *	1.064 *	1.052
Parents married to each other at HS graduation				1.499 †		1.088
Closeness to father			1.005			1.000
Closeness to mother			1.002			1.002
Arcsinh(household income at HS graduation)					1.594 **	1.579 *
Arcsinh(household net worth at HS graduation)					1.040 **	1.037 **

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.2e

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on College

Enrollment at Age 21 or Younger by the Number of Illnesses Experienced

Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with 1 condition (ref: healthy)	1.010	0.912	1.119	0.982	0.917	0.934
Father with 2-3 conditions (ref: healthy)	0.859	0.815	0.846	0.835	0.870	0.807
Father with 4+ conditions (ref: healthy)	0.634	0.531 †	0.637	0.623	0.702	0.588
Mother with 1 condition (ref: healthy)	1.394	1.224	1.489 †	1.448 †	1.417	1.301
Mother with 2-3 conditions (ref: healthy)	0.896	0.871	0.934	0.915	0.920	0.937
Mother with 4+ conditions (ref: healthy)	0.418 **	0.563 †	0.453 **	0.445 **	0.539 *	0.736
Student's socio-demographics:						
Female	1.612 **	1.406 †	1.600 *	1.631 **	1.841 ***	1.561 †
Black (ref: white)	0.434 ***	0.568 *	0.501 **	0.482 **	0.583 *	0.891
Other race (ref: white)	2.189 **	1.969 **	2.278 **	2.158 **	2.241 ***	2.208 **
Poor health	0.436 **	0.502 *	0.448 *	0.453 *	0.488 *	0.508 *
HS GPA (0-100% scale)		1.035 ***				1.038 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.244 *	1.180	1.278 *	1.207 †	1.269 *	1.236 †
Father's # of years of educational attainment	1.145 **	1.115 **	1.142 **	1.152 **	1.097 *	1.063
Mother's # of years of educational attainment	1.064 *	1.070 **	1.069 *	1.061 *	1.029	1.042
Father's age at student's HS graduation	0.990	1.013	0.996	0.990	0.990	1.023
Mother's age at student's HS graduation	1.090 **	1.082 *	1.091 **	1.083 *	1.069 *	1.055
Parents married to each other at HS graduation				1.634 *		1.082
Closeness to father			1.004			1.000
Closeness to mother			1.006			1.003
Arcsinh(household income at HS graduation)					1.719 **	1.710 **
Arcsinh(household net worth at HS graduation)					1.040 **	1.038 **

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.3a

Logistic Regression Odds Ratios of the Effects of (Any) Parental Health Conditions on

Expectation of 4-Year College Graduation at Age 21 or Younger

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
Measures of parental health conditions:						
Father with (any) illness	0.953	0.968	0.973	0.955	0.969	0.994
Mother with (any) illness	0.832	0.889	0.836	0.827	0.873	0.916
Student's socio-demographics:						
Female	1.244	1.073	1.216	1.241	1.338	1.100
Black (ref: white)	0.579 *	0.679	0.615 *	0.569 *	0.680 †	0.750
Other race (ref: white)	2.577 **	3.081 **	2.667 **	2.589 **	2.534 **	3.355 **
Poor health	0.461 **	0.542 †	0.453 **	0.459 **	0.495 *	0.541 †
HS GPA (0-100% scale)		1.030 ***				1.031 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.133	1.091	1.154	1.138	1.145	1.160
Father's # of years of educational attainment	1.203 ***	1.174 ***	1.199 ***	1.202 ***	1.169 ***	1.128 **
Mother's # of years of educational attainment	1.097 **	1.095 **	1.099 **	1.097 **	1.080 *	1.077 †
Father's age at student's HS graduation	0.983	0.984	0.981	0.983	0.986	0.988
Mother's age at student's HS graduation	1.065 *	1.068 *	1.070 *	1.066 *	1.052 †	1.060 *
Parents married to each other at HS graduation				0.922		0.573 *
Closeness to father			1.003			1.002
Closeness to mother			1.000			1.001
Arcsinh(household income at HS graduation)					1.306 *	1.447 *
Arcsinh(household net worth at HS graduation)					1.023 †	1.019

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.3b

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on Expectation of

4-Year College Graduation at Age 21 or Younger by Illness Severity

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
Measures of parental health conditions:						
Father with mild illness	1.002	0.968	1.002	1.011	0.992	0.969
Father with severe illness	1.185	1.380	1.202	1.194	1.184	1.465
Father with mental illness	0.717	0.754	0.764	0.710	0.797	0.813
Mother with mild illness	0.884	0.903	0.858	0.880	0.885	0.881
Mother with severe illness	0.772 †	0.883	0.792	0.768 †	0.799	0.928
Mother with mental illness	0.709 †	0.786	0.721	0.688 †	0.774	0.794
Student's socio-demographics:						
Female	1.253	1.081	1.230	1.246	1.331	1.109
Black (ref: white)	0.545 **	0.642	0.594 *	0.519 **	0.632 *	0.714
Other race (ref: white)	2.350 *	2.901 **	2.441 *	2.368 *	2.355 *	3.165 **
Poor health	0.488 **	0.577 †	0.477 **	0.483 **	0.514 *	0.572 †
HS GPA (0-100% scale)		1.029 ***				1.030 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.107	1.073	1.128	1.119	1.122	1.145
Father's # of years of educational attainment	1.197 ***	1.176 ***	1.193 ***	1.196 ***	1.171 ***	1.130 **
Mother's # of years of educational attainment	1.099 **	1.094 **	1.102 **	1.100 **	1.084 **	1.077 †
Father's age at student's HS graduation	0.984	0.982	0.981	0.983	0.985	0.984
Mother's age at student's HS graduation	1.058 *	1.063 *	1.064 *	1.061 *	1.050 †	1.060 *
Parents married to each other at HS graduation				0.815		0.529 *
Closeness to father			1.003			1.002
Closeness to mother			0.999			1.001
Arcsinh(household income at HS graduation)					1.250 †	1.426 *
Arcsinh(household net worth at HS graduation)					1.018	1.017

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.3c

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on Expectation of

4-Year College Graduation at Age 21 or Younger by Illness Timing

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
Measures of parental health conditions:						
Father with (any) illness diagnosed before HS	0.936	0.959	0.975	0.936	0.969	1.026
Father with (any) illness diagnosed during HS	1.249	1.250	1.226	1.250	1.272	1.282
Mother with (any) illness diagnosed before HS	0.733 †	0.795	0.734 †	0.731 †	0.750	0.776
Mother with (any) illness diagnosed during HS	0.879	0.937	0.853	0.878	0.954	0.958
Student's socio-demographics:						
Female	1.263	1.093	1.223	1.263	1.358 †	1.118
Black (ref: white)	0.605 *	0.698	0.662 †	0.601 *	0.720	0.813
Other race (ref: white)	2.300 *	2.802 **	2.388 *	2.304 *	2.266 **	3.077 **
Poor health	0.435 **	0.492 *	0.427 **	0.434 **	0.465 **	0.480 *
HS GPA (0-100% scale)		1.028 ***				1.028 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.175 †	1.126	1.203 †	1.177 †	1.192 †	1.205 †
Father's # of years of educational attainment	1.210 ***	1.186 ***	1.202 ***	1.210 ***	1.176 ***	1.137 **
Mother's # of years of educational attainment	1.087 **	1.085 *	1.089 **	1.087 **	1.070 *	1.067
Father's age at student's HS graduation	0.986	0.987	0.984	0.986	0.988	0.993
Mother's age at student's HS graduation	1.064 *	1.066 *	1.073 *	1.065 *	1.051 †	1.058 †
Parents married to each other at HS graduation				0.971		0.605 †
Closeness to father			1.004			1.003
Closeness to mother			1.002			1.003
Arcsinh(household income at HS graduation)					1.316 *	1.457 *
Arcsinh(household net worth at HS graduation)					1.024 †	1.019

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.3d

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on Expectation of

4-Year College Graduation at Age 21 or Younger by Illness Severity and Timing

Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with mild illness diagnosed before HS	1.064	1.060	1.078	1.071	1.074	1.097
Father with mild illness diagnosed during HS	1.199	1.131	1.213	1.209	1.202	1.159
Father with severe illness diagnosed before HS	0.920	0.908	0.944	0.928	0.906	0.942
Father with severe illness diagnosed during HS	1.155	1.502	1.065	1.169	1.144	1.480
Father with mental illness diagnosed before HS	0.719	0.737	0.760	0.708	0.782	0.740
Father with mental illness diagnosed during HS	0.885	1.047	0.906	0.900	1.014	1.281
Mother with mild illness diagnosed before HS	0.819	0.848	0.796	0.814	0.820	0.815
Mother with mild illness diagnosed during HS	0.799	0.757	0.779	0.792	0.827	0.752
Mother with severe illness diagnosed before HS	0.827	0.942	0.904	0.819	0.853	1.066
Mother with severe illness diagnosed during HS	0.797	0.889	0.762	0.800	0.823	0.847
Mother with mental illness diagnosed before HS	0.722	0.803	0.737	0.696	0.777	0.784
Mother with mental illness diagnosed during HS	1.001	1.055	0.926	0.981	1.097	1.052
Student's socio-demographics:						
Female	1.246	1.063	1.221	1.238	1.324	1.086
Black (ref: white)	0.563 *	0.662	0.615 *	0.532 **	0.648 *	0.735
Other race (ref: white)	2.345 *	2.890 **	2.503 *	2.363 *	2.361 **	3.287 **
Poor health	0.488 **	0.572 †	0.475 **	0.482 **	0.513 *	0.562 †
HS GPA (0-100% scale)		1.029 ***				1.030 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.119	1.091	1.136	1.133	1.135	1.168
Father's # of years of educational attainment	1.197 ***	1.176 ***	1.187 ***	1.196 ***	1.173 ***	1.127 **
Mother's # of years of educational attainment	1.100 **	1.095 **	1.105 **	1.101 **	1.087 **	1.079 †
Father's age at student's HS graduation	0.985	0.983	0.983	0.985	0.986	0.985
Mother's age at student's HS graduation	1.062 *	1.069 *	1.069 *	1.065 *	1.053 †	1.068 *
Parents married to each other at HS graduation				0.791		0.512 *
Closeness to father			1.003			1.002
Closeness to mother			0.999			1.000
Arcsinh(household income at HS graduation)					1.230 †	1.405 †
Arcsinh(household net worth at HS graduation)					1.019	1.017

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 2.3e

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on Expectation of

4-Year College Graduation at Age 21 or Younger by the Number of Illnesses Experienced

Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with 1 condition (ref: healthy)	1.001	0.962	1.010	1.006	0.966	0.943
Father with 2-3 conditions (ref: healthy)	1.000	0.981	1.012	1.006	1.014	0.991
Father with 4+ conditions (ref: healthy)	0.978	1.135	0.973	0.983	1.036	1.236
Mother with 1 condition (ref: healthy)	0.940	0.878	0.936	0.932	0.944	0.877
Mother with 2-3 conditions (ref: healthy)	0.980	1.047	0.981	0.970	0.992	1.063
Mother with 4+ conditions (ref: healthy)	0.427 **	0.506 *	0.440 **	0.417 ***	0.495 *	0.544 †
Student's socio-demographics:						
Female	1.235	1.063	1.208	1.229	1.318	1.086
Black (ref: white)	0.592 *	0.668	0.634 *	0.572 *	0.680 †	0.737
Other race (ref: white)	2.427 **	3.047 **	2.527 **	2.444 **	2.422 **	3.329 **
Poor health	0.456 **	0.534 *	0.454 **	0.450 **	0.488 **	0.524 *
HS GPA (0-100% scale)		1.028 ***				1.028 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.106	1.086	1.126	1.115	1.120	1.154
Father's # of years of educational attainment	1.186 ***	1.174 ***	1.183 ***	1.186 ***	1.162 ***	1.129 **
Mother's # of years of educational attainment	1.098 **	1.092 **	1.100 **	1.098 **	1.081 *	1.072 †
Father's age at student's HS graduation	0.985	0.985	0.983	0.984	0.986	0.988
Mother's age at student's HS graduation	1.063 *	1.067 *	1.068 *	1.066 *	1.052 †	1.061 *
Parents married to each other at HS graduation				0.853		0.540 *
Closeness to father			1.003			1.003
Closeness to mother			1.001			1.001
Arcsinh(household income at HS graduation)					1.265 †	1.448 *
Arcsinh(household net worth at HS graduation)					1.021 †	1.017

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Appendix 2.1

Detailed Descriptive Statistics on Health Conditions (Percentages)

	Whole sample (n=1,752)	At least one parent with:		
		any condition (n=1,516)	a severe condition (n=561)	a mental condition (n=476)
Type of father's health condition:				
Hypertension				
Asthma	36.08 %	42.31 %	51.86 %	41.09 %
Diabetes	10.01 %	11.73 %	17.15 %	17.22 %
Arthritis or rheumatism	12.94 %	15.17 %	17.73 %	16.25 %
Lung disease (bronchitis, emphysema)	21.03 %	24.66 %	28.83 %	30.85 %
Stroke	5.92 %	6.95 %	18.50 %	12.89 %
Cancer or a malignant tumor	1.69 %	1.98 %	5.27 %	2.92 %
Heart attack	5.53 %	6.49 %	17.27 %	7.13 %
Coronary heart dis., angina, heart failure	4.16 %	4.88 %	13.00 %	6.31 %
Loss of memory or mental ability	7.35 %	8.61 %	22.94 %	9.84 %
Emotional, nervous, or psych. problem	1.20 %	1.41 %	2.86 %	5.01 %
Learning disorder	9.19 %	10.78 %	12.83 %	38.23 %
Other chronic condition	3.84 %	4.50 %	7.14 %	15.97 %
Type of mother's health condition:	30.09 %	35.29 %	40.34 %	43.46 %
Hypertension				
Asthma	24.33 %	28.52 %	32.42 %	36.18 %
Diabetes	12.38 %	14.52 %	19.81 %	20.07 %
Arthritis or rheumatism	9.11 %	10.68 %	13.01 %	16.17 %
Lung disease (bronchitis, emphysema)	21.03 %	24.66 %	30.93 %	36.42 %
Stroke	5.15 %	6.04 %	16.08 %	12.62 %
Cancer or a malignant tumor	2.08 %	2.44 %	6.49 %	4.82 %
Heart attack	9.06 %	10.63 %	28.30 %	8.28 %
Coronary heart dis., angina, heart failure	1.09 %	1.28 %	3.40 %	2.25 %
Loss of memory or mental ability	4.58 %	5.38 %	14.32 %	6.93 %
Emotional, nervous, or psych. problem	2.14 %	2.51 %	4.94 %	8.90 %
Learning disorder	14.54 %	17.05 %	18.37 %	60.48 %
Other chronic condition	2.90 %	3.40 %	5.64 %	12.06 %

Notes: All numbers are weighted with PSID/TAS weights to be representative of the U.S. population.

Appendix 2.2a

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on College

Enrollment at Age 21 or Younger by Type of Illness

Dependent variable =1 if the respondent enrolled at college at age 21 or younger, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with hypertension	0.894	0.854	0.837	0.872	0.860	0.805
Father with asthma	0.796	0.676	0.790	0.802	0.849	0.730
Father with diabetes	0.894	1.055	0.995	0.883	0.879	1.180
Father with arthritis or rheumatism	0.779	0.649*	0.845	0.808	0.833	0.766
Father with lung disease (bronchitis, emphysema)	1.933†	1.759	1.867†	1.894†	2.006†	1.810
Father with stroke	0.748	0.768	0.538	0.751	0.787	0.498
Father with cancer or a malignant tumor	1.136	1.342	1.094	1.081	0.988	1.171
Father with heart attack	1.943	1.584	1.674	1.899	1.912	1.344
Father with coronary heart dis., angina, heart failure	0.386**	0.379**	0.455*	0.388**	0.347**	0.430*
Father with loss of memory or mental ability	2.400	2.196	1.923	2.324	2.695	1.571
Father with emotional, nervous, or psych. problem	0.664	0.728	0.613	0.677	0.757	0.727
Father with learning disorder	0.478*	0.569	0.432*	0.474*	0.530	0.542
Father with other chronic condition	1.493†	1.271	1.511†	1.502†	1.526*	1.258
Mother with hypertension	0.963	0.869	1.033	0.952	0.963	0.937
Mother with asthma	1.262	1.289	1.282	1.271	1.286	1.388
Mother with diabetes	1.152	1.368	1.069	1.113	1.143	1.375
Mother with arthritis or rheumatism	1.058	1.161	1.053	1.087	1.090	1.201
Mother with lung disease (bronchitis, emphysema)	0.596	0.689	0.580	0.620	0.649	0.691
Mother with stroke	1.839	1.215	2.079	1.765	2.206†	1.664
Mother with cancer or a malignant tumor	1.247	1.662	1.270	1.240	1.310	1.670
Mother with heart attack	0.132**	0.139*	0.101**	0.130**	0.120**	0.097**
Mother with coronary heart dis., angina, heart failure	0.552†	0.709	0.588†	0.562†	0.576	0.770
Mother with loss of memory or mental ability	0.256*	0.170*	0.279*	0.253*	0.264*	0.197*
Mother with emotional, nervous, or psych. problem	0.593*	0.753	0.564*	0.624†	0.661	0.731
Mother with learning disorder	0.716	0.738	0.839	0.766	0.834	1.099
Mother with other chronic condition	0.921	1.136	0.891	0.905	0.936	1.130
Student's socio-demographics:						
Female	1.575*	1.411	1.577*	1.589*	1.789**	1.609*
Black (ref: white)	0.408***	0.572*	0.472**	0.447**	0.543**	0.851
Other race (ref: white)	2.164**	1.947*	2.204*	2.157**	2.289**	2.121*
Poor health	0.419**	0.490*	0.420**	0.425**	0.447**	0.461*
HS GPA (0-100% scale)		1.036***				1.038***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.285**	1.192†	1.318**	1.260*	1.329**	1.261*
Father's # of years of educational attainment	1.155**	1.112*	1.154**	1.159**	1.112*	1.067
Mother's # of years of educational attainment	1.067**	1.072*	1.071**	1.065**	1.038	1.053
Father's age at student's HS graduation	0.988	1.010	0.993	0.988	0.988	1.021
Mother's age at student's HS graduation	1.089*	1.082*	1.089*	1.084*	1.077*	1.063
Parents married to each other at HS graduation				1.433		1.015
Closeness to father			1.005			1.000
Closeness to mother			1.003			1.001
Arcsinh(household income at HS graduation)					1.542*	1.519*
Arcsinh(household net worth at HS graduation)					1.040**	1.038**

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Appendix 2.2b

Logistic Regression Odds Ratios of the Effects of Parental Health Conditions on Expectation of

4-Year College Graduation at Age 21 or Younger by Type of Illness

Dependent variable =1 if the respondent expects to graduate from a 4-year college, =0 otherwise.						
	(1)	(2)	(3)	(4)	(5)	(6)
Measures of parental health conditions:						
Father with hypertension	0.910	0.828	0.867	0.917	0.898	0.791
Father with asthma	1.388	1.335	1.335	1.383	1.437	1.369
Father with diabetes	1.463	1.737	1.634	1.466	1.464	1.937
Father with arthritis or rheumatism	0.912	0.907	0.944	0.905	0.935	0.985
Father with lung disease (bronchitis, emphysema)	1.160	1.319	0.940	1.161	1.197	1.128
Father with stroke	0.958	1.265	0.730	0.956	1.007	0.978
Father with cancer or a malignant tumor	2.469 *	4.984 ***	2.331 †	2.500 *	2.326 †	5.218 ***
Father with heart attack	1.640	1.441	1.319	1.645	1.633	1.250
Father with coronary heart dis., angina, heart failure	0.510 *	0.548 †	0.648	0.510 *	0.484 *	0.642
Father with loss of memory or mental ability	0.717	1.027	0.813	0.720	0.707	1.129
Father with emotional, nervous, or psych. problem	0.944	0.922	1.078	0.940	1.019	1.038
Father with learning disorder	0.420 *	0.406 *	0.411 *	0.423 *	0.430 *	0.403 *
Father with other chronic condition	1.254	1.294	1.237	1.254	1.269	1.281
Mother with hypertension	0.886	0.737	0.923	0.887	0.891	0.779
Mother with asthma	1.070	1.191	1.114	1.069	1.070	1.243
Mother with diabetes	0.518 *	0.555 *	0.461 **	0.523 *	0.520 *	0.540 *
Mother with arthritis or rheumatism	1.051	1.196	1.094	1.043	1.056	1.181
Mother with lung disease (bronchitis, emphysema)	0.675	0.772	0.688	0.669	0.702	0.809
Mother with stroke	1.357	0.806	1.342	1.368	1.440	0.874
Mother with cancer or a malignant tumor	0.993	1.114	1.003	0.992	0.989	1.121
Mother with heart attack	0.264 †	0.262 *	0.223 †	0.267 †	0.260 †	0.259 *
Mother with coronary heart dis., angina, heart failure	0.842	0.992	0.895	0.843	0.855	0.993
Mother with loss of memory or mental ability	0.590	0.446	0.537	0.595	0.613	0.463
Mother with emotional, nervous, or psych. problem	0.831	0.930	0.831	0.818	0.894	0.888
Mother with learning disorder	1.208	1.415	1.450	1.182	1.396	1.956
Mother with other chronic condition	0.983	1.119	0.972	0.985	1.000	1.127
Student's socio-demographics:						
Female	1.234	1.081	1.240	1.231	1.309	1.120
Black (ref: white)	0.651 †	0.737	0.711	0.635 †	0.755	0.832
Other race (ref: white)	2.381 *	2.916 **	2.483 **	2.389 *	2.430 **	3.206 **
Poor health	0.472 **	0.544 †	0.456 **	0.470 **	0.491 **	0.519 *
HS GPA (0-100% scale)		1.027 ***				1.028 ***
Family/parents' socio-demographics:						
# of siblings under 18 years old in the household	1.127	1.093	1.147	1.133	1.143	1.157
Father's # of years of educational attainment	1.179 ***	1.154 ***	1.175 ***	1.179 ***	1.154 **	1.116 **
Mother's # of years of educational attainment	1.105 **	1.100 **	1.109 ***	1.105 **	1.090 **	1.088 *
Father's age at student's HS graduation	0.981	0.978	0.982	0.981	0.981	0.982
Mother's age at student's HS graduation	1.068 *	1.075 *	1.070 *	1.070 *	1.061 †	1.068 *
Parents married to each other at HS graduation				0.902		0.621 †
Closeness to father			1.005			1.004
Closeness to mother			1.000			1.000
Arcsinh(household income at HS graduation)					1.254 †	1.354 †
Arcsinh(household net worth at HS graduation)					1.020	1.016

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. All estimations also control for high school graduation year fixed effects. Regression estimates are weighted with PSID/TAS weights. Standard errors used for inference are calculated using the Taylor series linearization method. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

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CHAPTER 4

ESSAY 3: THE EFFECT OF PARENTAL ILLNESS ON COLLEGE GPA

INTRODUCTION

College Grade Point Average (GPA) is often regarded as a quantitative metric of

academic performance and accomplishment (Oliphant & Alexander, 1982; Werbel & Looney,

1994). Extensive research has documented the significance of college GPA in determining

academic and, subsequently, professional success. It plays a critical role in a student's overall

trajectory, impacting both short-term financial assistance opportunities and long-term career

prospects (Feldman & Kubota, 2015). During a student's college years, GPA often serves as a

decisive factor in determining eligibility for scholarships, financial aid, internship, and

admissions to graduate and professional schools. GPA also influences social networking

opportunities and the potential to receive recommendations. Additionally, GPA has been found

to contribute to college attrition and retention rates (Kern et al., 1998). Empirical studies indicate

a positive association between academic achievement and college retention, highlighting that

higher-performing students are more likely to continue their studies compared to their lower-

performing counterparts (Kirby & Sharpe, 2001; McGrath & Braunstein, 1997; Ryland et al.,

1994). Further, employers frequently view GPAs as useful predictors of a candidate's potential,

implying that the decisions about hiring are heavily influenced by academic performance (Roth,

1996). When screening resumes for job interviews, recruiters often prioritize GPA over other

aspects of an applicant's qualifications (Cole et al., 2003). Importantly, a college education has

become the threshold requirement for access to middle-class jobs (Carnevale et al., 2010), further emphasizing the role of academic achievements in influencing post-college economic well-being.

The purpose of this essay is to contribute to the literature on the familial determinants of college GPA. Specifically, I aim to measure the association between the onset of parental illness during the college years of young adults and the variation in their college GPA. These emerging adults are at a stage of life characterized by gaining independence from their parents, often by moving out of the family home and transitioning to financial autonomy. However, they have yet to establish the stable and long-term commitments typically associated with adulthood (Arnett, 2004). Parental illness during this transitional phase can significantly impact the young adult's college performance through multiple mechanisms. Dealing with parental illness can have a profound and prolonged impact on the young adult's mental health and daily functioning (Silverman, 2000). Sieh et al. (2013) conducted in-depth interviews with families of adolescents and young adults to examine the impact of parental illness on behavioral, psychosocial, and academic outcomes. They found that adolescents with chronically ill parents experienced higher levels of internalizing problems, shouldered more household and caregiving responsibilities, faced activity restrictions and isolation, and reported psychological distress culminating in a comparatively lower school grade point average. Family financial instability resulting from parental illness also contributed to the decline in students' academic outcomes. Although these effects were observed within a sample primarily consisting of pre-college-aged adolescents, it is reasonable to anticipate similar mechanisms at play among college-aged young adults.

In the following section, I review the existing literature on the broad determinants of college GPA, along with the empirical evidence on the conceptual mechanisms underlying the

association between parental illness and their children's academic performance in college. Subsequently, I discuss the study methodology, encompassing the empirical model, data sources, and measurement of variables.

LITERATURE REVIEW

A considerable body of empirical research has focused on cognitive abilities and psychological, sociological, and economic factors in studying the mechanism and determinants of academic success. These studies have indicated that college students' persistence and success are influenced by a range of individual attributes, institutional factors, economic factors (e.g., Aina et al., 2022), as well as students' interest in particular disciplines (Schiefele et al., 1992). Building upon the taxonomy introduced in the study of the impact of parental illness on high school GPA (first essay), it is convenient to categorize the determinants of college GPA into three sets: student-related, college-related, and family-related factors.

Student-related Factors

Prior academic achievements, such as ACT scores and high school GPA, serve as reliable predictors of college students' GPAs indicating the importance of cognitive ability as the key determinant of tertiary educational success (Komarraju et al., 2013; Robins et al., 2004; Saunders-Scott et al., 2018). However, academic success in college depends not only on understanding course content but also on the student's motivation, diligence, dedication, and grit (Komarraju et al., 2009; Ridgell & Lounsbury, 2004; Robbins et al., 2004). For example, a recent survey study conducted at a liberal arts college in the northeast United States with 523 students found a direct relationship between both intrinsic and extrinsic motivation and GPA (Norvilitis et al., 2022). Higher levels of grit have been associated with higher GPAs, even among students with lower SAT scores (Duckworth et al., 2007), indicating the importance of perseverance and

passion for long-term goals. Grit is defined as "perseverance and passion for long-term goal" that entails "working strenuously toward challenges, maintaining effort and interest over the years despite failure, adversity, and plateaus in progress" (Duckworth et al., 2007, p. 1087 and p. 1087-1088). However, despite its predictive value for college retention, a few studies have reported no statistically significant relationship between grit and GPA (Saunders-Scott et al., 2018).

Conscientiousness, among other personality traits, has also been identified as a robust predictor of college GPA (Conard, 2006; Noftle & Robins, 2007). In addition, Gehringer et al. (2021) highlighted the importance of task mastery and the sense of belonging, indicating that students who perceive a strong connection to their college and have confidence in their ability to succeed tend to achieve higher GPAs. Furthermore, studies have shown that college students who adopt a performance approach, focusing on outperforming others, tend to perform better academically than those who adopt a performance-avoidance mindset, focused on avoiding performing worse than their peers (Durik et al., 2009).

Among the remaining student-related factors, the first-generation status of college students stands out as an important determinant of college GPA (Aspelmeier et al., 2012; Strayhorn, 2007). A study conducted with 11,192 individuals from the Baccalaureate and Beyond Longitudinal Study found that generation status contributed to higher grades and explained a sizable portion of the variation in cumulative GPA in college implying that the first-generation status proxied for an extensive array of background and intervening variables in addition to "standard" demographic variables such as gender or race (Strayhorn, 2007). Another study involving 322 undergraduate students discovered that generational status significantly moderated the effect of students' psychological factors (e.g., self-esteem, locus of control) on academic achievements (Aspelmeier et al., 2012).

College-related Factors

A multitude of factors related to college experience can significantly influence the GPAs of college students. For example, the student-instructor relationship has been shown to impact student GPAs (Parnes et al., 2020). Additionally, the relationships and sense of community that students develop in college are known to predict GPA. A recent study at a large Midwestern University (N=246) revealed that support from college friends, as a moderator of the student's overall engagement, was a significant predictor of GPA (Bishop et al., 2023). Living on campus as a freshman has also been associated with higher GPAs compared to students not living on campus (Nicpon et al., 2006). Further, when college freshmen become part of university-organized living and learning communities on campus during their early college years, it positively impacts both retention and GPA (Caviglia-Harris, 2022). In the study tracking the performance of 4,179 freshmen from 2013-2017 at a mid-sized comprehensive state university, Caviglia-Harris (2022) found that students who participated in on-campus living and learning communities had a 6% lower student attrition rate and developed study habits that translated into higher grades.

Family-related Factors

Young adults often experience high levels of stress related to academic performance during their college years (Dyson & Renk, 2006), in addition to the stress associated with transitioning to a new phase in life. During those times, family support can play a critical stress-buffering role in effective coping with mental health adversities, thereby contributing to the young adult's psychological well-being (Pinkerton & Dolan, 2007; Stecker, 2004; McGee & Stanton, 1992; Hovey & Seligman, 2007). Past research suggests that emotional bonding with parents positively influences children's academic achievement. Conversely, conflictual

relationships with parents can cause considerable stress, impeding proper functioning in the academic setting (Amato & Gilbreth, 1999; Crosnoe & Elder, 2004; Demo & Acock, 1996).

Cheng et al. (2012) conducted a longitudinal examination spanning three consecutive semesters to examine the effects of family economic and social support on university students' GPAs. Their findings uncovered a significant correlation between students' perceptions of family social support and both the stability and amplitude of their GPA scores during this period. This suggests that student perceptions of family social support play a pivotal role in influencing their academic performance at the university level. Notably, this association was observed to be instrumental in fostering academic success among female students, irrespective of their family's economic backing. The empirical evidence suggests that the role of family social support on the academic achievement of women in college appears to be more pronounced compared to their male counterparts. However, it is worth noting that despite multiple studies demonstrating the moderating role of social support in academic success, some studies have provided contrary evidence. For example, Nicpon et al. (2006) did not find any relationships between social support and GPA in their study of 401 freshmen at a large urban university in the U.S. Southwest.

Parental Illness

Past studies have indicated that exposure to negative life experiences often results in poorer academic performance (Dyregov, 2004; Schwartz, 2003). The impact of stressful events within the last year typically has a greater effect on outcomes than the cumulative effect of past events experienced over a lifetime (Scully et al., 2000). A study by Windle and Windle (1996) hints that although emotional coping mechanisms related to stressful life events have a weak influence in terms of magnitude, they still serve as a significant determinant of academic

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functioning. Since the onset of parental chronic illness represents a traumatic event, a child's response is contingent upon factors such as their developmental stage, temperament, and previous experiences (Dyregov, 2010).

As their parents transit into middle age, children may encounter unforeseen and stressful life events associated with parents, such as parental illness (Neugarten & Neugarten, 1987). The diagnosis of a chronic illness imposes significant demands on family dynamics, necessitating immediate adaptations to daily routines and managing the illness within a short time frame (Rolland, 1999). This could disrupt parental involvement and reverse the direction and magnitude of the supporting role between the parents and children. When faced with a parental chronic illness, children encounter many challenges, such as looming fear of potential parental loss, increased household responsibilities, shifts in daily routines and schedules, and the drain on financial resources (Armistead et al., 1995). Such events can adversely influence students' emotional and academic performance over an extended period (Dyregov, 2004), and female students are at greater risk of emotional challenges than male students (Korneluk & Lee, 1998).

Studies underscore that parental illness makes young adults and adolescents more susceptible to psychological distress than preadolescent children (Compas et al., 1994). The heightened vulnerability can be attributed to young adults' developed cognitive and empathetic capacities, which enhance their awareness of their parent's health status and its potential loss (Christ et al., 1994). Sieh et al.'s (2013) conducted research focusing on individuals between the ages of 10 and 20, revealing that adolescents coping with a parent's chronic illness experienced lower GPA scores, heightened levels of caregiving and family responsibilities, daily challenges, heightened stress, and increased internalizing problem behaviors. The study also found that

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adolescents with an ill parent were more likely to fail a school year compared to their counterparts with healthy parents.

With the older adult population in the U.S. growing at a faster rate than other age groups (Goldberg-Looney et al., 2017), college-age students are increasingly required to engage in caregiving responsibilities (Goldberg-Looney et al., 2017; Sutter et al., 2017). However, there is still much to be learned about the impact of providing care to chronically ill parents on college students, both inside and outside the U.S. (Knopf et al., 2022; Lun, 2022; Runacres et al., 2021). Recent studies have highlighted the negative effects of engaging in caregiving while in college. These effects include a decline in academic performance (Lun, 2022; Runacres et al., 2021), deterioration of the student's physical and mental health, financial strain (Knopf et al., 2022; Runacres et al., 2021), and disruption to their work life and career plans (Lun, 2022).

A qualitative study conducted in Australia noted the challenges faced by young carers in college in "maintaining regular study routines, keeping up-to-date with preparatory coursework, and investing quality time and effort into drafting assignments" (Day, 2021, p. 1612). Further, college students providing unpaid care to their family members might encounter barriers to accessing higher education opportunities (Runacres et al., 2021). In the United Kingdom, it has been estimated that young adults who provide care are four times more likely to drop out of higher education than those who do not provide care (Kettell, 2020).

Some literature examined the challenges faced by students whose parents suffer from mental health issues. Similar to evidence from the literature on the effects of physical health, providing care to parents with mental illness has been found to hurt students' academic success. A mixed-method study (N=196) focused on undergraduate students in one college at a university in Detroit, Michigan, found that, compared to students whose parents did not suffer from mental

illness, students with parental mental illness reported higher levels of depression and anxiety (Mitchell & Abraham, 2018). Similarly, a small study (N=89) with participants from a large public university in the Southern U.S. noted that students felt burdened when caring for parents with mental illness (Crandall et al., 2014).

Parental support provides a pivotal safety net to their children (Pinkerton & Dolan, 2007). Given the high cost of college education, economic support from parents is of paramount importance to children during their college years. However, the onset of parental illness can limit the parent's labor market participation and reroute household economic resources toward healthcare expenditures, as discussed in Essay 1 (Chapter 2) of this dissertation. Consequently, both of these factors can then impact how the parents provide financial support to their children's college education. It is estimated that parents provide roughly $38,000 worth of assistance to their children when the children are transitioning to adulthood, the time when children start attending college (Schoeni & Ross, 2005). However, the onset of parental illness can potentially lead to a delay of this funding, or the funding might not be possible at all, which in turn can impact the children's academic performance.

Finally, as discussed in Essay 1 (Chapter 2) of this dissertation, parental illness can potentially alter the marital relationship between the mother and the father. Since the quality of the relationship between a child's mother and father is strongly correlated to the child's educational outcomes, the stress of parents' separation and parental illness can negatively affect the child's academic performance in college.

Building on the theoretical and empirical evidence reviewed above, I hypothesize that the onset of a new health condition experienced by parents will lead to a lower college GPA for their student-child. In line with hypotheses developed in the previous essays, here too, I expect that

the variables that proxy for conceptual pathways of the effect of parental poor health, i.e., the closeness of the parent-child relationship, parents' marriage stability, and the economic status of the family, will each attenuate the overall estimate of the impact.

METHODOLOGY

In line with previous essays, the data for the present empirical study are obtained from the 1999-2019 waves of the Panel Study Income Dynamics (PSID) and the 2005-2019 waves of the Transition to Adulthood Supplement (TAS). To create the estimation sample, young adult participants from the TAS survey are paired with their parent-respondents from the PSID survey. As before, I include only those young adults from the TAS survey whose parents were alive during the survey interview.

In this essay, I investigate the impact of the onset of parental illness on college GPA while utilizing the longitudinal dimension of the data to control for individual and time-invariant heterogeneity. In the equations below, GPA_{it} denotes the measure of the college grade point average of the i-th individual at time t, C_{it} represents a binary indicator measuring the reported onset of health conditions experienced separately by each parent of the i-th young adult at time t during their college attendance period. Vectors X_{it} and Z_i, respectively, include observed time-variant and time-invariant control variables that could otherwise confound the identification of the effect of parental illness on their child's academic performance. One way of modeling the relationship between GPA and parental illness is via the following pooled OLS regression specification:

$$GPA_{it} = \mu + \tau_1 C_{it}^{Mother} + \tau_2 C_{it}^{Father} + X_{it}\, \varphi + Z_i\, \eta + e_{it} \tag{3}$$

where e_{it} is the random error term. The analytical challenge with the estimation of this model is that unobserved and thus uncontrolled variables (such as personality traits shared by parents and

their children) could confound the identification of the coefficient estimates if they are simultaneously correlated with the child's GPA and parental health. In other words, such an endogeneity problem would render the estimates biased.

One way to deal with the issue of unobserved heterogeneity is to use the fixed effects estimation strategy, which involves time demeaning of the data. In Equation (4), the error term from the previous model is decomposed as $e_{it} = u_i + \varepsilon_{it}$, where u_i is a person-specific component of the overall error and ε_{it} is the remaining idiosyncratic component of the overall error (the equation also no longer includes an intercept as it would be collinear with u_i), and all other elements are as in Equation (3) above:

$$GPA_{it} = \tau_1 C_{it}^{Mother} + \tau_2 C_{it}^{Father} + X_{it}\,\varphi + Z_i\,\eta + u_i + \varepsilon_{it} \tag{4}$$

The fixed effect model is obtained by subtracting from Equation (4) an equation in which the dependent and independent variables are averaged over time "within" each observation:

$$(GPA_{it} - \overline{GPA_i}) = \tau_1(C_{it}^{Mother} - \overline{C_i^{Mother}}) + \tau_2(C_{it}^{Father} - \overline{C_i^{Father}}) + (X_{it} - \overline{X_i})\,\varphi$$
$$+ (\varepsilon_{it} - \overline{\varepsilon_i}) \tag{5}$$

Since elements Z_i and u_i are time-invariant, their "within-observation" averages over time are equal to the values observed in any period and are canceled away in this transformation. In other words, the within transformation used in the estimation of fixed effects models removes the time-invariant unobserved heterogeneity regardless of whether these variables are observed or not. Thus, this technique allows me to estimate the coefficients for the explanatory variables without the unobserved heterogeneity bias.

The parameters of interest are τ_1 and τ_2 as they measure the effects of the onset of parental illness during the college years of young adults on their college GPA. Thus, the estimates of parameters τ_1 and τ_2 reveal the degree of change in the young adult's college GPA

before and after encountering parental health adversities. Negative point estimates imply a decline in academic performance due to the young adult's parents experiencing the onset of illness during their college years.

The TAS survey enquires those respondents who were still in college at the time of the interview about their most recent college GPA and the upper limit of the GPA used by that school. While most colleges have a 4-point grade scale, the scales may vary by college, and several sampled respondents report higher maximum possible GPA in their college (e.g., 5.0 or 12.0). To improve the validity of comparisons of change in GPAs between respondents who attended colleges with different scales, I convert the reported GPAs to the percentage scale (0-100) by dividing the GPA by the scale limit and multiplying the result by 100.

The PSID enquires whether respondents and their spouses have ever received a medical diagnosis from a doctor for each of the following health conditions: cancer, stroke, heart attack, heart disease, hypertension, diabetes, asthma, lung disease, arthritis, memory loss, learning disability, psychological conditions, or other conditions. I use responses to these questions to code the indicators of onsets of health adversities. Similar to the previous essays, I first estimate the effect of the onset of any of the health conditions. Next, I estimate the differential effects of the onset of severe, mild, and mental health on the outcome variables. Lastly, I estimate the effect of each individual health condition separately on the outcome variables.

The baseline model includes a set of time-variant control variables X_{it}: indicator variables for the college year (freshman, sophomore, junior, senior, 5th year or longer), father's and mother's age, student's health (excellent, very good, good, fair and poor), and respondent fixed effects.

To analyze the potential pathways of how parental illness affects a student's college GPA, I also estimate augmented model specifications by consecutively adding the following additional control variables: the quality of each parent-child relationship, household net worth and income, and an indicator of parents being married to each other.

RESULTS

Table 3.1 presents the descriptive statistics for the pooled estimation sample (n=3,364, column 1), and separately for the sub-samples of young adults with both parents healthy (n=788, column 2), those with at least one parent diagnosed with a chronic health condition (n=2,576, column 3), a severe condition (n=725, column 4) and a mental condition (n=434, column 5). All descriptive statistics, as well as the subsequent estimations, are weighted using the PSID/TAS weights to be representative of the U.S. population of young adults.

The average college GPA across the whole pooled estimation sample is 83.73%. A closer examination of the data reveals that young adults with both parents in good health have a slightly higher average GPA of 84.12% compared to 83.80% for those with at least one parent diagnosed with any health condition, 83.59% of those with a parent with a severe condition, and 81.44% for those with a parent with a mental condition.

Among the sampled college students, 58% have a father and 52% have a mother diagnosed with at least one health condition during their time in college. Mild conditions are the most common, affecting around 53% of fathers and 44% of mothers. Approximately 12.9% of fathers and 11.6% of mothers are diagnosed with an onset of a severe condition. Mental health conditions are the least observed, affecting about 6% of fathers and 9% of mothers.

An in-depth examination of the prevalence of the types of health conditions shows that hypertension is the most common health condition among both fathers (33%) and mothers (22%)

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of the sampled college students. Other commonly observed diagnoses include diabetes (12% for fathers, 7% for mothers), arthritis (12% for fathers, 15% for mothers), asthma (7% for fathers, 8% for mothers), and cancer (6% for fathers, 7% for mothers). The least frequently observed conditions among fathers include stroke (1%), loss of memory or mental capacity (1%), and learning disorders (1%), while among mothers, these are heart attack (less than 1%), loss of memory/mental capacity (1%), and learning disorder (1%).

The sample demonstrates a relatively balanced distribution across college attendance years. Approximately 34% of the observations represent freshmen, 11% are sophomores, and juniors and seniors each account for about 9% of the sample. The largest group within the overall pooled estimation sample consists of students in their 5th year or beyond, comprising 37% of the sample. Notably, among students with at least one parent diagnosed with a mental health condition during their college years, this group's proportion increases to 43%. Overall, in the sub-samples of respondents with at least one ill parent, higher proportions of students appear to be in the later stages of their studies relative to the sub-group with healthy parents.

Although "very good" is the most frequently reported description of respondents' health, those with healthy parents have the highest comparative percentage of students reporting excellent or very good health and the lowest percentage reporting fair or poor health. About 1% of students in the whole sample reported poor health, but this percentage is higher in the groups with parent(s) suffering from severe or mental illness.

Regarding familial sociodemographics, slightly more than 90% of the sampled college students have parents married to each other. However, this percentage drops by more than 11 points when considering those whose parents experience mental illness. In general, young adults report being closer to their mothers compared to their fathers across all groups, except for the

group with parent(s) experiencing mental illness. On a scale of 0-100%, young adults rated closeness to their mothers at 63% and to their fathers at 61%. While closeness to fathers is stable across all sub-groups, respondents in the group with at least one parent experiencing mental illness rate the closeness to their mother more than 5 points lower than the overall sample. The average household income and net worth of the pooled estimation sample, measured in 2019 dollars, are $154K and $597K, respectively. Predictably, families where both parents are healthy have a noticeably higher financial status than families where at least one parent suffers from an illness, particularly if the health issue is mental.

The multivariate analysis involves estimating various variants of the least squares fixed effect regression model introduced as Equation (5) in the methodology section above. Initially, the estimation involves regressing the percentage measure of current college GPA on binary variables indicating whether the father and the mother were diagnosed with any adverse health condition, along with a set of control variables. Table 3.2 outlines the results of these estimations for five model specifications. The first column displays the estimation results for the most parsimonious model, which includes essential control variables such as indicators of the year of college attendance, student's health status, number of siblings under 18, and year fixed effects. Subsequent columns (2-4) introduce additional variables aimed to delve deeper into potential mechanisms through which a parent's health condition may influence a young adult's college GPA. Column 2 considers the student-parent relationship closeness as a proxy for parental support and the time spent with parents. Column 3 adds the marital status of parents, while Column 4 incorporates household income and net worth. By introducing these variables, I can investigate how the coefficient on parental illness changes, thereby revealing the underlying

mechanisms of the effects under investigation. Finally, Column 5 presents the results of the fully specified model, which includes all covariates concurrently.

It is crucial to emphasize that, unlike in Study 1 and Study 2 where cross-sectional comparisons were used for effect identification, this study relies on within-respondent variation to identify the effects. Additionally, fixed effects estimation utilizes time-demeaned data to implicitly control for all time-invariant factors, such as gender, race, etc., as well as unobserved variables (e.g., personality traits, inherent intelligence, or cognitive ability), under the assumption that these variables do not change over time.

Table 3.2 reveals that the onset of a new health condition experienced by the mother leads to a statistically significant decrease in her student-child's college GPA by 0.732 percentage points (p<.05). This effect and its statistical significance remain unchanged with the inclusion of parental marital status and household economic status variables. However, the effect of the mother's health event becomes statistically non-significant with the inclusion of controls for the closeness of the parent-child relationship, even though the estimated absolute size of the effect slightly increases. When all covariates are accounted for simultaneously, the impact of the mother's chronic condition becomes even larger in magnitude and marginally significant (b=-0.837, p<.1). Across all estimated models, the coefficient on the variable indicating the onset of the father's chronic health condition is negative but non-significant.

In terms of other covariates, a change in a student's self-reported health status from good to excellent is associated with an improvement of approximately 1–1.5 percentage points (p<.05) in their college average grades. As expected, students who transition from good to poor health experience a decrease in college GPA by approximately 2.2–2.6 percentage points. There appears to be a decline in students' GPAs with each passing year in college, but the variation

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associated with controls for college years is not statistically significant. Lastly, there is a slight improvement in college GPA as the family gains an additional child.

The analysis reported above gives equal weight to all chronic illnesses measured in my data. However, it is important to acknowledge that some health conditions may be more severe than others and have the potential to disrupt family functioning to a greater extent. To gain a deeper understanding of the impact of parental health conditions on the child's academic performance, I re-estimate the models with health condition variables operationalized based on their type and anticipated severity.

Table 3.3 reveals that the experience of a severe health condition (i.e., cancer or a malignant tumor, stroke, lung diseases such as bronchitis or emphysema, coronary heart disease, angina, heart failure, or heart attack) by the mother during college years of the child leads to a statistically and quantitatively significant reduction in the child's college GPA, averaging slightly over 1.7 percentage points (p<.01). Similar to previous findings, the impact of the mother's severe condition appears to be robust against controlling for factors such as parental marital status, household income, and net worth. However, the effect becomes noticeably smaller in magnitude and non-significant when the quality of the parent-child relationship is accounted for, either as a single additional covariate or in the model when all other covariates are accounted for simultaneously. This suggests that the parent-child relationship effectively captures an important aspect of the potential pathway through which the effect operates. Interestingly, when holding the quality of the parent-child relationship constant in estimations, the negative impact of the onset of maternal mental health condition becomes marginally significant.

Table 3.4 presents the estimates of the effects of each new parental health condition on the GPA of their child in college while controlling for the onset of other health adversities.

Surprisingly, several estimates on indicators of health conditions experienced by the father are positive though only the estimate associated with the onset of diabetes is statistically significant. On the other hand, many coefficient estimates related to the health conditions experienced by the mother are negative, with cancer and psychological conditions being statistically significant. It is important to interpret these estimates cautiously as the inclusion of multiple health conditions in the same model may introduce multicollinearity issues. Multicollinearity can lead to inflated standard errors of coefficient estimates, resulting in less precise and statistically non-significant point estimates. Nonetheless, the overall pattern of results largely aligns with earlier findings. When considering the quality of the parent-child relationship, either as a single additional control variable or with all other covariates simultaneously, the coefficient estimate for the mother's onset of cancer diminishes in magnitude and loses significance, while the estimate for the onset of mental illness increases in size and becomes more significant.

The results from the three sets of regressions reported above consistently indicate that the onset of a severe health condition experienced by the mother has a significant and negative impact on the child's college GPA, with changes in the parent-child relationships playing a crucial role in this effect. To further investigate the underlying mechanism, I conduct auxiliary least squares fixed effects regressions using the closeness of the parent-child relationship as the dependent variable, parental health events as independent variables, and control variables including the year of college attendance, student's health, and year fixed effects. However, the results from these auxiliary regressions are inconclusive and are not reported here. On one hand, I observed a positive coefficient for the onset of a severe condition experienced by the mother. This suggests that the negative effect of the mother's severe health problem on the child's GPA could be explained by increased time spent with the mother in caregiving or domestic

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responsibilities, which may reduce study time and subsequently lead to a lower GPA. If this mechanism is "suppressed" in GPA regressions due to the closeness with the mother being held constant, it would explain why the significance of health variables is lost in those regressions. On the other hand, the estimate for the mother's severe condition lacks precision in the relationship regression, rendering it statistically non-significant and the explanation provided herein somewhat speculative. Further studies are needed to conduct a detailed examination of the mechanisms of this underlying effect.

DISCUSSION AND CONCLUSION

In the last essay in this dissertation, my objective was to investigate the impact of parental illness on academic performance during the final phase of most young adults' formal education, namely their college grades. Leveraging the panel dimension of the PSID/TAS dataset, I conducted a series of fixed effects least square regressions to analyze the association between college GPA and the occurrence of new health conditions in both mothers and fathers.

The findings of the study revealed that the onset of any health condition experienced by the mother was associated with a reduction of approximately 0.7 percentage points in her child's college GPA. However, in cases where the health condition was classified as severe (cancer, stroke, heart attack, heart disease, or lung disease), the decline in GPA was more pronounced, amounting to approximately 1.7 percentage points. Furthermore, the inclusion of variables that accounted for the parent-child relationship closeness in the model attenuated the effect of severe health conditions. This suggests that the time spent with the parent, potentially due to assuming new caregiving responsibilities, may serve as a key mechanism explaining the impact of the mother's physical illness on her child's college performance.

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Another noteworthy finding of my research pertains to the impact of the onset of mental health events. Initially, the parsimonious models did not identify maternal mental health as a significant factor influencing the college performance of the child. However, I observed a statistically significant negative effect of new maternal mental illness on college GPA when estimating models that accounted for selected potential pathways of the effect (such as the closeness of the parent-child relationship, changes in parents' marital status, and fluctuations in the family's economic standing). Although not directly examined in my study, it is plausible that the psychological burden on the child or the increased time devoted to household responsibilities are the underlying factors contributing to this effect.

My findings also align with the theoretical predictions put forth by Bowlby's Attachment Theory, which underscores the importance of the parent-child relationship in a child's developmental trajectory and their capacity to navigate stressful circumstances. Specifically, when a mother experiences illness, particularly in the realm of mental health, it can disturb the secure foundation that Bowlby emphasized as vital for a child's feelings of safety and stability. This disruption may help explain the observed decline in the child's academic performance.

My findings carry broad implications for the fields of education and counseling services, particularly concerning family well-being. A substantial amount of anecdotal evidence supports the role of formal counseling services in colleges, as well as the support provided by peers, advisors, and instructors in assisting students in navigating the challenges that arise from parental illness. While I am not aware of the academic literature that would assess the efficacy of the specific support systems available at universities and colleges for students facing parental illness, it is noteworthy that numerous institutions across the United States already offer a range of

counseling services to address students' distressing situations, encompassing not only

bereavement support but also various other forms of assistance.

My findings underscore the significance of implementing targeted support systems that

cater specifically to the needs of students who are confronted with the challenges of severe

parental illness at home. These provisions, which encompass psychological counseling and

mental health resources, can play a crucial role in assisting students in effectively managing their

academic responsibilities while concurrently coping with the personal difficulties associated with

parental illness. Furthermore, enhancing academic counseling to offer more personalized and

adaptable study pathways, along with providing extended learning assistance, can potentially

prove highly advantageous for students who grapple with the repercussions of parental illness.

Additionally, equipping faculty members with appropriate training to better identify and support

students facing parental illness holds promising potential for promoting student well-being in

such circumstances.

As children embark on their college education and establish new connections outside the

home, they have the opportunity to form additional relationships and attachments, such as peer

attachments. These college-based peer attachments may constitute another method to alleviate

the stress experienced as a result of parental illness. Encouraging the development of peer

support networks within the institutional student support strategies could be another beneficial

strategy utilized by institutions of higher education, as these networks could provide a valuable

space for students in similar circumstances to find mutual understanding and support.

In the realm of healthcare, professionals must consider family dynamics, particularly the

quality of parent-child relationships when devising care plans for mothers dealing with severe

illnesses. Additionally, my findings underscore the need for further research into effective

intervention strategies that can mitigate the adverse impacts observed and provide

comprehensive support for both the students and their families. In sum, my findings underline

the need for a comprehensive, integrative, compassionate, and flexible approach to supporting

students dealing with a parent's severe illness while pursuing their college education.

Table 3.1

Descriptive Statistics (Means/Percentages)

	Whole sample (n=3,364)	Both parents healthy (n=788)	At least one parent with:		
			any condition (n=2,576)	a severe condition (n=725)	a mental condition (n=434)
College GPA (measured on a 0-100% scale)	83.73%	84.12%	83.80%	83.59%	81.44%
Father with (any) health condition	58.01%	0.00%	94.73%	84.92%	76.70%
Mother with (any) health condition	51.52%	0.00%	61.32%	77.75%	89.57%
Type of father's health condition:					
Mild	52.69%	0.00%	86.10%	66.60%	63.09%
Severe	12.86%	0.00%	21.83%	58.84%	18.83%
Mental	5.80%	0.00%	9.48%	9.15%	44.56%
Type of mother's health condition:					
Mild	44.18%	0.00%	50.78%	54.80%	66.23%
Severe	11.60%	0.00%	18.96%	54.09%	22.83%
Mental	9.35%	0.00%	11.08%	14.30%	71.48%
Detailed type of father's health condition:					
Hypertension	33.32%	0.00%	54.41%	45.25%	35.77%
Asthma	7.08%	0.00%	11.56%	10.45%	11.50%
Diabetes	12.06%	0.00%	19.70%	12.96%	15.39%
Arthritis or rheumatism	12.14%	0.00%	19.84%	20.00%	24.72%
Lung disease (bronchitis, emphysema)	1.92%	0.00%	3.13%	7.63%	5.21%
Stroke	1.16%	0.00%	1.89%	5.10%	3.80%
Cancer or a malignant tumor	5.95%	0.00%	10.08%	27.20%	8.25%
Heart attack	3.56%	0.00%	5.82%	14.84%	5.04%
Coronary heart dis., angina, heart failure	4.74%	0.00%	7.75%	19.36%	5.84%
Loss of memory or mental ability	1.05%	0.00%	1.72%	2.95%	8.05%
Emotional, nervous, or psych. problem	4.78%	0.00%	7.81%	7.32%	36.45%
Learning disorder	1.43%	0.00%	2.34%	3.28%	10.80%
Other chronic condition	13.77%	0.00%	22.49%	15.49%	24.64%
Detailed type of mother's health condition:					
Hypertension	21.67%	0.00%	24.14%	31.90%	34.28%
Asthma	8.48%	0.00%	10.61%	13.32%	17.75%
Diabetes	7.44%	0.00%	8.93%	11.72%	17.83%
Arthritis or rheumatism	15.47%	0.00%	19.61%	21.28%	30.80%
Lung disease (bronchitis, emphysema)	2.77%	0.00%	4.52%	12.82%	11.44%
Stroke	1.36%	0.00%	2.23%	6.36%	2.62%
Cancer or a malignant tumor	6.56%	0.00%	10.72%	30.59%	8.46%
Heart attack	0.78%	0.00%	1.27%	3.62%	3.43%
Coronary heart dis., angina, heart failure	1.71%	0.00%	2.80%	8.01%	5.13%
Loss of memory or mental ability	0.99%	0.00%	1.38%	3.13%	7.55%
Emotional, nervous, or psych. problem	8.61%	0.00%	10.25%	12.98%	65.78%
Learning disorder	1.13%	0.00%	1.43%	3.09%	8.61%
Other chronic condition	14.63%	0.00%	17.65%	19.78%	34.70%
Student's socio-demographics:					
Freshman	34.37%	37.64%	33.29%	32.57%	29.99%
Sophomore	11.40%	12.63%	10.68%	10.02%	11.04%
Junior	8.70%	7.24%	8.91%	7.79%	8.72%
Senior	8.74%	8.65%	9.30%	9.53%	7.18%
Super senior, i.e., 5+ year	36.79%	33.84%	37.82%	40.10%	43.05%
Self-reported health: excellent	20.74%	24.21%	20.30%	19.52%	15.97%
Self-reported health: very good	45.34%	48.35%	44.51%	45.41%	40.40%
Self-reported health: fair good	26.19%	21.38%	27.25%	26.40%	32.41%
Self-reported health: fair	6.55%	5.57%	6.56%	6.30%	9.15%
Self-reported health: poor	0.97%	0.49%	1.12%	2.02%	1.28%
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.60	0.76	0.54	0.41	0.47
Parents married to each other	91.01%	91.25%	91.31%	91.46%	79.37%

Closeness to father (0-100% scale)	61.0	57.5	62.1	63.2	61.4
Closeness to mother (0-100% scale)	63.4	61.2	64.6	67.0	58.1
Household income	$ 153,737.10	$ 173,377.70	$ 150,427.80	$ 159,313.60	$ 129,753.40
Household net worth	$ 596,974.30	$ 781,815.80	$ 558,264.40	$ 698,173.80	$ 353,815.50

Notes: All numbers are weighted with PSID/TAS weights to be representative of the U.S. population. All dollar value variables (income, net worth) have been expressed in 2019 dollars (conversion using the Bureau of Labor Statistic's Consumer Price Index for All Urban Consumers, i.e., CPI-U). Some percentages may not add to 100 due to rounding.

Table 3.2

Fixed Effects OLS Estimates of the Effects of (Any) Parental Health Conditions on College GPA

	(1)	(2)	(3)	(4)	(5)
Dependent variable: college grade point average (measured on a 0-100% scale).					
Measures of parental health conditions:					
Father with (any) illness	-0.346	-0.545	-0.355	-0.354	-0.498
Mother with (any) illness	-0.732 *	-0.780	-0.747 *	-0.741 *	-0.837 †
Student's socio-demographics:					
Sophomore (ref: freshman)	-0.029	-0.017	-0.071	-0.036	-0.053
Junior (ref: freshman)	-0.055	0.202	-0.047	-0.046	0.243
Senior (ref: freshman)	-0.282	0.007	-0.295	-0.297	-0.019
Super senior, i.e., 5+ year (ref: freshman)	0.315	0.600	0.330	0.321	0.622
Self-reported health: excellent (ref: good)	0.913 *	1.535 *	0.907 *	0.925 *	1.543 *
Self-reported health: v. good (ref: good)	0.417	0.639	0.406	0.434	0.654
Self-reported health: fair (ref: good)	0.650	1.309 †	0.650	0.636	1.297 †
Self-reported health: poor (ref: good)	-2.577 †	-2.272	-2.543 †	-2.531 †	-2.226
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.559 *	0.604 †	0.590 *	0.557 *	0.651 *
Parents married to each other			-1.888 †		-1.995
Closeness to father		-0.002			-0.002
Closeness to mother		-0.004			-0.003
Arcsinh(household income)				-0.010	-0.027
Arcsinh(household net worth)				-0.032	-0.043

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. Fixed effects estimations implicitly control for all time-invariant observed (e.g., race, sex) and unobserved (e.g., personality traits) variables. All estimations also control for year fixed effects. Regression estimates are weighted with PSID/TAS weights. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 3.3

Fixed Effects OLS Estimates of the Effects of Parental Health Conditions on College GPA by

Illness Severity

	(1)	(2)	(3)	(4)	(5)
Dependent variable: college grade point average (measured on a 0-100% scale).					
Measures of parental health conditions:					
Father with mild illness	0.348	0.685	0.346	0.356	0.686
Father with severe illness	0.820	1.050	0.820	0.806	1.094
Father with mental illness	0.319	0.157	0.304	0.419	0.275
Mother with mild illness	-0.225	-0.471	-0.224	-0.215	-0.462
Mother with severe illness	-1.708 **	-1.190	-1.710 **	-1.723 **	-1.268
Mother with mental illness	-1.076	-1.692 †	-1.081	-1.038	-1.694 †
Student's socio-demographics:					
Sophomore (ref: freshman)	-0.325	-0.517	-0.330	-0.354	-0.585
Junior (ref: freshman)	-0.526	-0.615	-0.527	-0.525	-0.610
Senior (ref: freshman)	-0.286	-0.081	-0.288	-0.316	-0.127
Super senior, i.e., 5+ year (ref: freshman)	0.064	0.186	0.064	0.058	0.139
Self-reported health: excellent (ref: good)	0.789 †	1.501 *	0.789 †	0.814 †	1.543 *
Self-reported health: v. good (ref: good)	0.423	0.728	0.423	0.446	0.767
Self-reported health: fair (ref: good)	0.916 †	1.778 *	0.917 †	0.908 †	1.760 *
Self-reported health: poor (ref: good)	-2.325 †	-1.817	-2.322 †	-2.258	-1.735
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.712 **	0.782 *	0.713 **	0.719 **	0.796 *
Parents married to each other			-0.190		-0.129
Closeness to father		-0.008			-0.008
Closeness to mother		-0.002			-0.001
Arcsinh(household income)				0.026	-0.022
Arcsinh(household net worth)				-0.044 †	-0.066 †

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. Fixed effects estimations implicitly control for all time-invariant observed (e.g., race, sex) and unobserved (e.g., personality traits) variables. All estimations also control for year fixed effects. Regression estimates are weighted with PSID/TAS weights. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

Table 3.4

Fixed Effects OLS Estimates of the Effects of Parental Health Conditions on College GPA by

Type of Illness

	(1)	(2)	(3)	(4)	(5)
Dependent variable: college grade point average (measured on a 0-100% scale).					
Measures of parental health conditions:					
Father with hypertension	0.181	0.421	0.173	0.201	0.451
Father with asthma	0.325	0.367	0.274	0.249	0.120
Father with diabetes	1.736 *	1.717	1.743 *	1.711 *	1.624
Father with arthritis or rheumatism	-0.429	-0.136	-0.433	-0.418	-0.155
Father with lung disease (bronchitis, emphysema)	0.206	0.139	0.195	0.287	0.253
Father with stroke	1.248	1.666	1.230	1.325	1.773
Father with cancer or a malignant tumor	0.458	0.533	0.456	0.497	0.656
Father with heart attack	0.810	2.926	0.800	0.614	2.820
Father with coronary heart dis., angina, heart failure	0.069	-0.122	0.076	0.050	-0.203
Father with loss of memory or mental ability	-1.629	0.175	-1.627	-1.866	-0.476
Father with emotional, nervous, or psych. problem	-0.268	-0.420	-0.296	-0.165	-0.221
Father with learning disorder	-0.411	11.924	-0.397	-0.153	11.958
Father with other chronic condition	-0.113	0.531	-0.107	-0.111	0.590
Mother with hypertension	-0.025	-0.329	-0.022	-0.037	-0.413
Mother with asthma	-0.426	-0.972	-0.432	-0.516	-1.034
Mother with diabetes	1.326 †	1.374	1.336 †	1.361 †	1.413
Mother with arthritis or rheumatism	-0.540	-1.447 *	-0.539	-0.559	-1.571 *
Mother with lung disease (bronchitis, emphysema)	-1.158	-0.353	-1.147	-1.040	-0.070
Mother with stroke	0.967	0.611	0.962	0.935	0.405
Mother with cancer or a malignant tumor	-2.537 **	-2.079	-2.545 **	-2.547 **	-2.197
Mother with heart attack	1.201	1.056	1.146	1.015	0.691
Mother with coronary heart dis., angina, heart failure	-2.340	-1.386	-2.340	-2.198	-1.141
Mother with loss of memory or mental ability	-1.949	-1.385	-1.950	-1.973	-1.498
Mother with emotional, nervous, or psych. problem	-1.374 †	-2.289 *	-1.388 †	-1.358 †	-2.354 *
Mother with learning disorder	1.874	2.822	1.869	2.090	3.181
Mother with other chronic condition	-0.049	0.068	-0.052	-0.012	0.103
Student's socio-demographics:					
Sophomore (ref: freshman)	-0.220	-0.321	-0.230	-0.252	-0.408
Junior (ref: freshman)	-0.581	-0.647	-0.584	-0.577	-0.631
Senior (ref: freshman)	-0.279	-0.034	-0.283	-0.306	-0.081
Super senior, i.e., 5+ year (ref: freshman)	0.064	0.230	0.065	0.062	0.194
Self-reported health: excellent (ref: good)	0.762 †	1.346 *	0.763 †	0.782 †	1.379 *
Self-reported health: v. good (ref: good)	0.413	0.670	0.412	0.434	0.720
Self-reported health: fair (ref: good)	0.921 †	1.834 *	0.921 †	0.902	1.801 *
Self-reported health: poor (ref: good)	-2.290	-2.040	-2.278	-2.215	-1.953
Family/parents' socio-demographics:					
# of siblings under 18 years old in the household	0.706 **	0.802 *	0.709 **	0.710 **	0.829 *
Parents married to each other			-0.367		-0.388
Closeness to father		-0.008			-0.008
Closeness to mother		-0.002			-0.002
Arcsinh(household income)				-0.021	-0.098
Arcsinh(household net worth)				-0.043	-0.073 *

Notes: Household income and net worth variables are measured in 2019 dollars and transformed using the inverse hyperbolic sine function. Fixed effects estimations implicitly control for all time-invariant observed (e.g., race, sex) and unobserved (e.g., personality traits) variables. All estimations also control for year fixed effects. Regression estimates are weighted with PSID/TAS weights. P-values: *** < 0.001, ** < 0.01, * < 0.05, † < 0.1.

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CHAPTER 5

CONCLUSION

This three-essay dissertation aimed to explore the role of parental illness on the academic performance of the child in adolescence and young adulthood. It extends the scholarly literature by investigating the impacts of parental illness on (1) the child's high school GPA in Essay 1, (2) the odds of the child attending college at the age of 21 or younger, and the child's expectations of graduating from a four-year college in Essay 2, and (3) college grades in Essay 3.

All empirical investigations comprising my dissertation used the data from multiple recent waves of the Panel Study of Income Dynamics and its Transition into Adulthood Supplement. In Essays 1 and 2, I conducted estimations that identified the effect of the timing of parental illness onset based on cross-sectional comparisons, distinguishing between cases where the illness onset occurred before or after the child's enrollment in high school. In Essay 3, I leveraged the panel dimension of the data and implemented the fixed effect estimations to determine how academic performance in college responds to onsets of parental health adversities.

In each of the essays, I conducted tests to examine the extent to which the estimated impacts of parental health changed when accounting for factors such as (1) the self-reported closeness of the parent-child relationship, which provided insights into the time children spend with their parents, the caregiving responsibilities assumed, and parent-child support systems; (2) indicators of parental marital status, capturing potential disruptions to family composition

arising from the illness; and (3) household income and net worth, which allow for an assessment of the changes in family economic circumstances related to the illness.

The findings in Essay 1 indicated that severe illnesses of mothers, such as cancer, heart disease, or mental health issues that occur before a child's high school years, are detrimental to the child's high school GPA. This impact remains consistent even when factors such as the closeness of the parent-child relationship, changes in parental marital status, and shifts in household income and net worth are taken into account. This study also revealed that the simultaneous occurrence of four or more illnesses experienced by the mother has an outsized negative impact on the child's high school GPA. However, I did not find convincing evidence indicating that health adversities experienced by fathers yield any observable impact on their children's high school GPAs.

Essay 2 revealed that maternal illness, specifically severe or mental health conditions and the co-occurrence of 4 or more health conditions, significantly and negatively influence a child's expectation of completing a 4-year college degree and actual college enrolment at the age of 21 or younger. The study also revealed that a father's severe illness before high school slightly reduces a child's odds of college enrollment. Children whose mothers experienced chronic illness before the commencement of high school have lower expectations of completing four years of college education. I also observed that the high school GPA serves as a mediating factor in these scenarios, particularly if the mother experiences severe or mental illness. The quality of parent-child relationships and economic status also emerged as relevant pathways of parental illness effects on college enrollment.

Essay 3 of the dissertation revealed that the onset of a severe maternal illness during a child's college years significantly impacts the child's college GPA, and the effect is mediated by the quality of the parent-child relationship.

The findings from all the studies included in this dissertation are mutually aligned and coherent. Results suggest that maternal health conditions diagnosed before high school have enduring effects on children's high school GPA, suggesting long-term impacts. Unmeasured and unaccounted factors, possibly psychological distress or increased household responsibilities for children, may be driving the long-term negative effects on education.

To fully comprehend the underlying factors contributing to these variations, further research is warranted. Additionally, research is needed to understand why maternal illness has a larger impact on a child's educational attainment compared to health adversities encountered by fathers. Findings from this dissertation emphasize the far-reaching consequences of parental illness on a child's schooling and college success and justify a range of efforts aimed to mitigate some of the negative impacts of parental illness. For example, educational institutions could improve their support mechanisms and policies (e.g., mental, social, academic, and other relevant forms of counseling, etc.) for children who are coping with ill parents.

I conclude with an account of some limitations of my study and propose directions for future research. Multiple pieces of literature reviewed in this dissertation reported that parental illness can lead to children experiencing psychological distress and being compelled to adopt caregiving roles for their ailing parents. Although it is likely a major mechanism underlying the effects observed in my study, the data used in this research lacks a direct measure of such caregiving roles and the psychological strain experienced by children. As a substitute, the measure of parent-child relationship closeness was employed as a proxy, likely encompassing

both time constraints due to the child's caregiving responsibility (or other household obligations) and psychological distress. However, it is important to acknowledge that this variable may not comprehensively capture the nuances of the effects of those factors. Future research endeavors should aim to directly assess the impact of caregiving responsibilities and psychological distress, thereby providing a more precise understanding of the pathways through which these effects manifest.

The first and second essays in this study employed a methodology based on cross-sectional comparisons to investigate the effects of parental illness on GPA, college enrollment, and college completion expectations. Thus, it is important to note that the documented relationships between the dependent and independent variables should not be understood as causal relationships. Instead, these observed effects should be interpreted as correlations, providing insights into the statistical relationships between these variables without implying causation. It is crucial to consider that unobserved factors, such as socioeconomic disadvantage or individual personality traits, may simultaneously influence both the likelihood of parental illness onset and a child's school performance. This issue is of lesser concern in the third essay, which utilized longitudinal data methodology to account for unobserved time-invariant heterogeneity during estimation. Nonetheless, future studies, whenever feasible, should attempt to replicate the results obtained in this research using quasi-experimental methodologies that enable causal inference from the observed findings.

It is important to acknowledge that the estimation sample in this study was drawn and some key variables were coded under certain assumptions due to the absence of explicit data. For example, data on the commencement of high school was missing in all data waves and data on completion was missing in two waves. To address this limitation, where the data was missing, it

was assumed that students embarked on their high school journey at the age of 14 and concluded at 18. This methodological assumption, however, potentially misidentifies those students who commenced high school prior to the age of 14 or those who were still enrolled beyond the age of 18. To mitigate potential bias arising from the subjective nature of self-reported data and measurement errors, future studies should aim to obtain administrative data instead. Administrative data sources can provide more objective and accurate information, thereby enhancing the reliability and validity of the research findings.

The findings of this study suggest that children whose mothers were diagnosed with a chronic illness before the commencement of high school may have experienced academic difficulties during their earlier school years, which potentially persisted into their secondary education. To gain a comprehensive understanding of the temporal dynamics of this phenomenon, it is recommended that future research investigates the effects of maternal illness across the child's earlier school years. This longitudinal approach would provide insights into the developmental trajectory of academic difficulties in relation to the timing of the mother's illness, enabling a more nuanced understanding of the long-term impact on the child's educational outcomes. Such investigations would contribute to a deeper comprehension of the relationship between parental illness and academic performance, offering valuable insights for intervention strategies aimed at supporting children facing similar challenges in their educational journey.

Lastly, it is worth noting that this study intentionally omitted children and young adults whose parents passed away. The absence of parental figures due to illness or other causes may have a profound impact on a child's academic performance. Exploring the effect of parental loss on academic outcomes represents an important avenue for future research, as it may reveal

additional insights into the complex dynamics between parental illness, academic performance,

and the psychosocial well-being of children and young adults.