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Role of Parenting Styles in Human Capital Development of Children: Evidence from the British Understanding Society

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Abstract

We attempt to evaluate the relationship between parenting style and socio-emotional skills of children aged 5, using the British Understanding Society dataset. We run OLS regressions in which the outcome variable is the SDQ Total Difficulties score of the child and the main independent variables of interest are parental inputs including parental warmth, parental harshness, child's sleeping and meal time routine and parental time investment. Our results suggest a negative relationship between parental warmth and child's SDQ Total Difficulties score and a positive relationship between parental harshness and child's SDQ Total Difficulties score. In addition, children in the lower income households are more vulnerable to parental harshness, than the children in higher income households.

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1 Introduction

Non-cognitive skills of children, particularly socio-emotional skills, have an important role in human capital accumulation. That's why the factors which contribute to child socio-emotional skills have been widely researched. In this thesis, we study the role of parenting style in influencing the socio-emotional skills of children in their early years.

Parenting style is divided into three categories: Authoritarian, Authoritative and Permissive. In the authoritarian parenting style, parents restrict their child's choices, by directly imposing their preferences on the child (Doepke & Zilibotti, 2017). Neither do they consider their children's opinions while setting the rules, nor do they explain the reasoning behind their rules. It is the strictest parenting style, which involves harsh punishments for disobedience such as shouting or smacking. In the authoritative parenting style, parents try to mold their child's preferences, according to what they consider is best for the child's well-being (Doepke & Zilibotti, 2017). They focus on discipline but they are not as strict as authoritarian parents. Authoritative parents account for children's opinions, while setting rules. They are willing to explain the reasoning behind the rules and choices they make for their children. They are more nurturing than authoritarian parents and they do not inflict harsh punishments in case of misconduct. A permissive parenting style gives children the freedom to make their own decisions, based on their "natural inclinations" (Doepke & Zilibotti, 2017). Permissive parents are more nurturing than demanding and they do not set strict rules for their children.

We utilize the British Understanding Society data for our study. We run OLS regressions, in which the outcome variable is the Strength and Difficulties (SDQ) Total Difficulties score of children aged 5. Our main independent variables of interest are parental warmth and harshness. Moreover, we include variables on how much of a regular mealtime and sleep time routine the children follow. Furthermore, we include parental educational and non-educational time investment variables as other parental inputs. Additionally, we include a set of covariates such as the child's health, mother's physical and mental health, mother's education, and subjective financial situation. First, we conduct the analysis for only Wave 3, and then we aggregate Waves 3 to 11 and run the regression on the aggregated sample. We also run regressions on aggregated data from odd-numbered waves and even-numbered

waves separately. Lastly, we evaluate the relationship between parenting style and child socio-emotional skills separately for households, which earn an income below and above the median income of the sample.

This thesis highlights some important findings. Parental harshness is positively linked to children's socio-emotional problems while parental warmth is negatively linked to children's socio-emotional skills. In particular, maternal warmth in the past has a significant and negative relationship with children's socio-emotional problems in the present. In fact, maternal warmth in the past seems to mitigate the negative effects of maternal harshness. Also, equalized household income plays an important role in the relationship between parenting style and children's socio-emotional skills, such that children, who belong to the lowest income quartile group are more vulnerable to suffering from the negative effects of maternal harshness than the children who belong to the highest income quartile group.

We organize the rest of the thesis as follows. In Section 2, we review some literature related to the production function of human capital and parenting style. In Section 3, we explain the construction of our variables of interest and present some descriptive statistics of the variables we used in our model. Then, in Section 4, we explain our empirical methodology and in Section 5, we present the results of our estimation. Section 6 explains the findings, with respect to the current literature related to parenting style. It also explains some ways to improve our analysis and proposes ideas for future research on this topic. Section 7 concludes the paper.

2 Literature Review

2.1 Importance of Human Capital in Early Years

The Organization for Economic Cooperation and Development (OECD) defines human capital as the "stock of knowledge, skills and other personal characteristics" that help individuals to be more productive. Individuals invest in their human capital by pursuing formal education or informal training (OECD, 2022). According to the World Bank Group, human capital consists of health and educational outcomes. Health outcomes are usually measured by child survival, stunting rates, and adult survival rates. Educational outcomes are usually measured by years of educational attainment and test scores. Higher human capital leads to higher earnings for individuals, higher GDP for countries, and better cohesion in societies. It plays a major role in sustainable development and poverty reduction (World Bank, 2021).

Early childhood skills have an important role in human capital accumulation because early childhood events have long-run consequences and children are more malleable and vulnerable to negative environmental factors during their early years. Additionally, the development achieved during the early years might facilitate future growth and enhance the productivity of future investments in human capital (Attanasio, 2015). According to the Lancet series, there are around 200 million children in developing countries, who are at the risk of not developing their full potential. This is because they are exposed to negative external factors such as lack of clean water and nutritious food, exposure to violence, maternal depression, and poor parenting practices. It will be very difficult to compensate for the damages inflicted on these children, due to which they face development delays (Engle et al., 2011).

Interventions that were started to increase human capital investments in the early years have been proven to have a significant impact on adult outcomes. The Perry Preschool Program is a major example of such interventions. It targeted African American children aged 3 or 4, who belonged to low-income households and whose IQs were below 85, at age 3. The children were randomly assigned to treatment and control groups. The intervention consisted of a preschool program focused on improving cognitive skills, along with home

visits to improve the parent-child relationship. The children were also made to perform a set of tasks, which helped in improving their social skills. The participants were followed-up until turned 40, in order to evaluate the long-term effect of the intervention. The participants in the treatment group had a higher probability to graduate from high school by age 18, and performed better in the California Achievement Test, than those in the control group. The ones in the treatment group were also less likely to be involved in illegal activities, than the ones in the control group, before turning 40 (Heckman et al., 2006).

The Abecedarian Project was a randomized controlled trial, which was designed to determine whether it was possible to reduce the likelihood of developmental delays and academic failures for children born in low-income families, through intensive early childhood education. Children in the treated group took part in educational activities from early infancy until they reached kindergarten at age 5. These educational activities were designed to improve the language, cognitive, socio-emotional, and gross and motor skills of the children. Using the data from the follow-up surveys, Campbell et al. (2012) found that members of the treatment group had completed more years of education by age 30, than members of the control group. Treated individuals were 4 times more likely to attend a 4-year college or university by age 30 than individuals in the control group. Moreover, those in the treated group had a higher probability of being employed and had higher job prestige scores than those in the control group. Furthermore, treated participants were less likely to require public welfare than the ones in the control group. In addition, those who received the early childhood treatment had a lower probability to become teen parents or getting involved in drugs.

Another example of such an intervention is the Jamaican Supplementation Study (JSS). This program targeted stunted children aged 9-24 months. The intervention consisted of either supplementation or stimulation, or both. Supplementation means that the participants were provided with formula milk. Stimulation means that the mothers were encouraged to play with the kids effectively, in order to boost the non-cognitive skills of children. Both interventions contributed to improving cognitive skills in the short term. However, only stimulation improved both cognitive and non-cognitive skills in the long term.

In particular, stimulation helped in improving internalizing behavior. Moreover, stimulation increased earnings at age 22, by 33% (Kautz et al., 2014).

Johnson and Jackson (2019) evaluate the impact of long-term, sustained interventions related to early human capital investments on long-run adult outcomes for children in low-income families, using the Panel Study of Income Dynamics (PSID) dataset. One of the interventions they examined was the Head Start program, which was the largest early childhood intervention program in the US. It increased access to early childhood education and pediatric care for disadvantaged children. The other intervention they studied was the court-ordered school finance reforms (SFRs), which increased the level of spending per pupil by public K-12 schools in the US. The authors exploited the geographic variation in the timing of Head Start and court-ordered SFRs, to run difference-in-difference models. The results indicated that for poor children, increases in Head Start spending and public school K12 spending increased educational attainment and earnings in adulthood and decreased the probability of poverty and imprisonment in adulthood. The authors also found evidence of dynamic complementarity between Head Start spending and public school K12 spending for poor children. This means that the long-run advantages of Head Start spending for poor children depend on the subsequent level of public school K12 spending, and vice versa.

2.2 Importance of Non-cognitive Skills for Human Capital

Non-cognitive skills during early childhood can significantly influence adult human capital outcomes such as success in the labor market, involvement in crimes, and health outcomes (Kautz et al, 2014). Heckman et al (2006) provide evidence that non-cognitive skills such as risk aversion, self-esteem, perseverance, motivation, and self-control have a significant impact on earnings, educational attainment, smoking, teen pregnancy, crime, and achievement test scores.

Socio-emotional skills include the ability to interact with others, be organized, delay gratification, and pay attention. While cognitive skills are difficult to modify in later years, socio-emotional skills are easier to change in later years. Socio-emotional skills can even help in the improvement of cognitive skills and other aspects of human capital (Attanasio, 2015). For example, individuals who have patience and have the ability to delay gratification,

are more likely to live a healthier lifestyle and work hard to build a career, instead of spending excessive time on leisure activities.

Heckman and Rubinstein (2001) utilize evidence from the General Educational Development (GED) program in the United States to exhibit the role of non-cognitive skills in contributing to educational outcomes and wages. The GED is an achievement test taken by high school dropouts, in order to be certified as an equivalent of a high school graduate. GED recipients had similar cognitive skills, which were measured by the Armed Forces Qualification Test (AFQT), as high school graduates who did not yet go to college. However, after controlling for cognitive ability, GED recipients earn less, remain employed for shorter periods, go through fewer years of schooling, have higher divorce rates, and have higher chances of going to jail, relative to high school graduates. These differentials exist because GED recipients have lower non-cognitive skills than high school graduates. These findings support the claim that cognitive skills are not sufficient for success in the labor market. They should be complemented with non-cognitive skills as well.

In 1991, the US Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted a study on skills necessary for the American labor force. The Commission reported the following three categories of foundation skills that all high school graduates should have: Basic Skills, Thinking Skills, and Personal Qualities. Basic skills include reading, listening, speaking, writing, and arithmetic. Thinking skills include creative writing, problem-solving, reasoning, and so on. Personal qualities include responsibility, self-esteem, integrity, and sociability. In addition, the Commission specified interpersonal competencies such as negotiation, teamwork, leadership, and so on. to be successful in the professional world. In the National Employer Survey, which was done in the mid-1990s in the US, employers ranked non-cognitive skills such as communication skills and attitude, above cognitive skills such as schooling and test scores, for success in workplaces (Zemsky, 1997). According to the findings of a 2002 survey of 4000 employers in the UK, 23% of employers reported a lack of communication skills, customer handling skills, and teamwork skills among a significant number of their staff (Hillage et al., 2002).

2.3 Production Function of Human Capital in Early Years

A considerable amount of literature focuses on the factors affecting cognitive and non-cognitive skills of children i.e. human capital development during early years. Frank and Meara (2019) analyze the effect of maternal depression and substance abuse on child development during their early school years, by utilizing the National Longitudinal Survey of Youth (NLSY). They found that after controlling for the mother's early life circumstances such as the mother's cognitive test score, grandparents' substance abuse, and permanent income, maternal depression has a significant association with the socio-emotional skills of children. The mechanism through which this occurs is through the disruption of the home environment. On the other hand, maternal depression was not significantly associated with Reading and Mathematics test scores i.e. cognitive skills. The authors also found evidence that maternal substance abuse interfered with the mother's activities, which aimed to provide emotional support to children. Thus maternal substance abuse was linked to both cognitive and socio-emotional development.

Carneiro et al. (2013) investigate the impact of maternal education on child cognitive and non-cognitive outcomes, probability of grade repetition, and child obesity, using the National Longitudinal Survey of Youth (NLSY) dataset. The authors measure maternal education, through the variable which reports the completed years of schooling. For the child's cognitive ability, they utilize the Peabody Individual Achievement Tests (PIAT) scores for Mathematics and Reading. For the child's non-cognitive outcomes, they consider the Behavior Problem Index (BPI). They instrument maternal education with local tuition fees, distance to college, and local labor market variables. Their results indicate a positive relationship between mother's education and Mathematics and Reading test scores for children aged 7 and 8. For children who are 12 and 14 years old, the effect of mother's education on Mathematics test scores is positive but smaller than that for children whose ages are 7 and 8. Also, maternal education is strongly linked with BPI for children in both age groups. However, the effect of maternal education on Mathematics test score becomes weaker with the child's age, while the effect of maternal education on BPI remains the same.

We came across several papers which evaluate the effect of maternal employment on child outcomes. The relationship between maternal employment and child development

depends on how much her income relaxes the household budget constraint and the price and quality of child care alternatives and other inputs into the child human capital production function (Currie & Almond, 2011). Hsin and Felfe (2014) evaluate the effect of maternal employment on time spent with children, and also the effect of parental time investments on child development, by utilizing the Child Development Supplement of the Panel Study of Income Dynamics (PSID-CDS). Parental time investments include educational activities such as time spent studying, doing homework, and being talked to or read to, structured activities such as sports, music, and art classes, and unstructured activities such as watching television and listening to music. For child outcomes, the authors considered both cognitive outcomes such as the Woodcock-Johnson Revised Test of Achievement (WJ-R) test scores, and non-cognitive outcomes such as the Behavior Problem Index (BPI) and the Positive Behavioral Scale (PBS). They find that unstructured maternal time investment is negatively related to test scores while educational and structured maternal time investment is positively related to test scores and positive behavior. These results are in line with the claim that employed mothers replace the total time spent with their children, with higher quality time. In fact, employed mothers reduce the time spent with children, which is harmful to child development, and increase the time spent with children on activities that are beneficial for child development. Moreover, they find that for mothers with an intermediate level of education, particularly those who have studied up to high school, maternal employment is negatively related to total time, structured time, and unstructured time with children. These findings reflect a positive picture of maternal employment with respect to child outcomes.

In contrast, Ruhm (2004) found negative effects of maternal employment on child outcomes. Using the National Longitudinal Survey of Youth (NLSY) data, the author evaluates the relationship between maternal employment and the cognitive outcomes of children. He finds that maternal employment is linked to a decline in the verbal ability of children aged three and four. Also, he finds that maternal employment is associated with decreases in Reading and Mathematics test scores for children aged five and six.

Some periods are more critical and sensitive for child development than others. If particular skills are not acquired during the critical period, they become difficult to acquire later on. For example, younger children find it easier to learn the grammar and syntax of a

new language than older children. Remediation strategies for disadvantaged children should be enacted as early as possible because they become less effective as children grow up (Cunha & Heckman, 2007). O'Connor et al. (2000) carried out a study on Romanian children adopted by UK families between 1990 and 1992, who were living in severely deprived orphanage environments before. The Romanian children faced social, emotional, and cognitive isolation in those orphanages. After being adopted into UK families, their developmental outcomes improved but the later they were taken out from the orphanages, the worse their cognitive outcomes were at age 6. In addition, early human capital investment should be followed by later investment, otherwise, its impact decreases over time (Cunha & Heckman, 2007).

In several papers, the authors estimate the production functions of human capital, which allow non-linearity, self-productivity, and complementarity of inputs. Nicoletti and Rabe (2019) use the National Pupil Database (NPD), which is a register dataset for all children in state schools in England, to evaluate the effect of school inputs on cognitive skills. They measure cognitive skills in the form of test scores at the end of compulsory schooling, at age 16. They estimate an augmented value-added model by letting the cognitive skills at the end of compulsory schooling, depend on cognitive skills measured at the end of primary school, at age 11. Their model also allows complementarity between school inputs and past cognitive skills. This means that in their model, the return to school inputs varies across children with different levels of past cognitive skills. The authors found evidence of both complementarity and self-productivity. Self-productivity of cognitive skills means that cognitive skills at the end of primary school persist into secondary school and increase the productivity of school inputs in secondary school.

There are numerous papers, which attempt to determine the role of parental investments as an input into the production function of human capital. Attanasio et al (2020) evaluate the channels through which an early childhood intervention in Columbia led to an increase in cognitive and socio-emotional skills of disadvantaged children. The intervention was directed toward children, aged between 12 and 24 months, who belonged to disadvantaged families. They considered disadvantaged families as those who were beneficiaries of the conditional cash transfer program in Columbia. The intervention included

a micro-nutrient supplementation component and a psycho-social stimulation component. In the psycho-social stimulation component of the program, there were weekly home visits to mothers, for 18 months. The purpose of the home visits was to improve the parenting practices of mothers with young children. The psycho-social stimulation component of the intervention had a significant short-term impact on the language and cognitive skills of children. To study the channels through which the intervention led to improvements in child development, the authors estimated parents' investment functions and the production functions for cognitive and socio-emotional skills. They modeled the accumulation of future skills as a process that is determined by parental investments, parental human capital, the child's current stock of skills, and unobservable shocks. They discovered that firstly, the child's current stock of skills contributes significantly to the development of future skills. Secondly, they found evidence that parental investments, maternal human capital, and current skills are complementary in the development of future skills. In particular, material investments are more important for cognitive skills and time investments are more important for non-cognitive skills. Thirdly, they found that the intervention contributed to a gain in the children's cognitive and socio-emotional skills, entirely through an increase in parental investments.

Attanasio et al. (2017) estimate Constant Elasticity of Substitution (CES) production functions for human capital using data from the Young Lives Survey in Ethiopia and Peru. They particularly focus on health and cognitive skills as human capital outcomes. They found that cognitive skills and health are very persistent, which means that cognitive skills and health conditions in adulthood heavily depend on cognitive skills and health conditions during childhood respectively. Moreover, they found that health is cross-productive. This means that good health conditions have a positive effect on the production of cognitive skills in early childhood. Furthermore, they found a significant impact of parental investments on child cognitive skills, but the impact decreases as the child grows older. In addition, the authors performed some counterfactual simulations in order to evaluate the impact of either increasing only parental investments or increasing parental investments and improving health conditions for children with cognitive deficits at age 5. They found that this leads to significant gains in cognitive skills, which are sustained up to age 15. They also demonstrate that rich and poor children with identical baseline skills will have huge gaps in cognitive

skills by age 15 because richer parents carry out more time and material investments for their children than poorer parents.

Cunha and Heckman (2007) develop a multi-stage model of human capital formation in children, in which the outcomes can be both cognitive and non-cognitive skills. Each stage in the model represents a particular period in the child's life. Moreover, the model is dynamic such that the inputs or investments at each stage produce outputs in the future stage. Furthermore, the child's skills under consideration are self-productive, which means that skills acquired in one period improve the same skills in the future period. In addition, the model exhibits dynamic complementarity, which means that skills produced at one stage increase the productivity of future investments. Self-productivity and dynamic complementarity produce multiplier effects for child skills. These features of the model imply that early childhood investments for disadvantaged children have higher returns than investments made in later years.

Cunha et al. (2010) estimate a multi-stage model of the accumulation of children's cognitive and non-cognitive skills at different stages of the life cycle of children, with parental investments as a major determinant of child skills, using the National Longitudinal Survey of the Youth (NLSY) dataset. They found that as children grow older, the self-productivity of both cognitive and non-cognitive skills gets stronger. Moreover, complementarity between cognitive skills and parental investment becomes stronger as children grow older. This means that it is more difficult to compensate for the effects of a lack of parental investments on cognitive skills at older ages, than at younger ages. On the other hand, complementarity between non-cognitive skills and parental investments becomes weaker as children grow older. In other words, it is easier to compensate for the effects of a lack of parental investments on non-cognitive skills, at later stages of childhood. Furthermore, they found that 34% of the variation in educational attainment is explained by cognitive and non-cognitive skills in childhood. 15% of the variation in educational attainment is explained by parental investments.

Carneiro et al. (2015) evaluate the effect of the timings of parental income on adult outcomes, using administrative data from the Norwegian registry. They find that child's schooling is maximized when family income shifts from middle childhood to early

childhood. They also find that the effects of a shift in family income from early childhood to later childhood correspond to an inverse U-shaped relationship. This means that as family income in early childhood decreases and family income in middle childhood decreases, there is an improvement in child outcomes initially, but after a certain threshold is crossed, there is a decline in child outcomes. These results can be explained by models of child human capital, in which parental time and material investments are one of the major inputs. According to these models, parental investments in both early childhood and later years are more productive than parental investments in middle childhood. In addition, parental investments in early childhood and later years exhibit complementarity.

2.4 Role of Parenting Style in Human Capital Development in Early Years

Parenting style can potentially create a favorable environment at home, which influence the development of early childhood cognitive and non-cognitive skills. This further helps in laying down the foundation for human capital development in adulthood.

The family psychology literature attempts to uncover the relationship between parenting style and child skill development to a great extent. Most of the literature indicates a positive relationship between parents' involvement and monitoring of their children's educational and after-school activities and the children's educational attainment and academic achievement (Spera, 2005).

Mensah and Kuranchie (2013) study the role of parenting style in adolescent children's social development. The authors utilized data from a study, which consists of teachers and students from basic schools in Sunyani East and West Educational Districts of the Brong Ahafo region of Ghana. The students provided information on the parenting style of their parents. The teachers provided information on the behavioral traits of the students such as assertiveness, cooperativeness, sobriety, impulsiveness, and so on, as showcased by the interactions of the students with other students and the school staff. The results indicated a positive relationship between authoritative parenting style and good conduct displayed by children. In addition, children whose parents had a predominantly authoritarian parenting style were rated as socially incompetent by their teachers. In contrast, the results depicted no

significant relationship between permissive parenting style and students' behavioral outcomes.

Aunola and Nurmi (2005) investigated the impact of various dimensions of parenting style such as affection, behavioral control, and psychological control on their children's internalizing and externalizing problem behavior during their transition from kindergarten to primary school. They utilized data from the Jyvaskyla Entrance into Primary School (JEPS) study, which tracks children's academic and motivational development during their transition from kindergarten to primary school and the role of family and classroom environment in this development. Their sample consisted of children aged 5 or 6 years. They found evidence that none of the parenting style variables were associated with children's internalizing problem behavior, while only parental affection was associated with children's externalizing problem behavior. A high level of parental psychological control combined with high affection is associated with an increase in children's internal and external problem behavior. On the other hand, a high level of parental behavioral control combined with a low level of psychological control is associated with a decrease in external problem behavior. The authors provide the following explanation for these findings: when high affection is combined with high psychological control, it becomes manipulative and guilt-inducing, which further restricts children's expression of their emotions and thoughts.

Kuppens and Ceulemans (2019) studied the impact of parenting style on children's behavioral outcomes, using data from a Flemish large-scale study. For child behavioral outcomes, the authors obtained measures of externalizing problems, internalizing problems, and prosocial behavior from the Strength and Difficulties (SDQ) questionnaire. The following parenting style variables were used by the authors: congruent authoritative parenting style, congruent positive authoritative parenting style, congruent authoritarian parenting style, and congruent uninvolved parenting style. Parents with a congruent authoritative parenting style are warm with their children but they also set clear rules for their children. They discipline their children's undesirable behavior but they do not employ harsh punishments to do so. Parents with a congruent positive authoritative parenting style show warmth and set rules for their children but they rarely discipline their children for undesirable behavior. Parents with a congruent authoritarian parenting style display less warmth towards

their children and do not set clear rules for their children. They also resort to harsh punishment methods such as corporal punishment when their children behave in an undesirable manner. Parents with a congruent uninvolved parenting style do not show warmth to their children and do not set clear rules for their children. They also do not discipline undesirable behavior. The authors found evidence that children of authoritarian parents display more internalizing and externalizing problems and less prosocial behavior than children of authoritative or uninvolved parents. Moreover, children of two positive authoritative parents displayed the lowest levels of conduct problems.

Simons & Conger (2007) investigate the impact of parenting style on positive and negative outcomes for adolescents, by utilizing data from the second and third waves of the Iowa Youth and Families Project. They considered the following outcomes for adolescents: conduct problems, depression, and school commitment. Parents who were highly responsive and demanding were categorized as authoritative while parents highly demanding but not responsive were categorized as authoritarian. Parents who were highly responsive but not demanding were classified as indulgent whereas parents who were neither demanding nor responsive were labeled as uninvolved. Parental responsiveness was constructed from questions related to parental warmth and hostility. Parental demandingness was constructed from questions related to the consistency of parents' discipline and monitoring of their children. The results showed that children of authoritative parents have greater school commitment and lower levels of conduct problems and depression. On the other hand, children of authoritarian or uninvolved parents have lower levels of school commitment and greater levels of conduct problems and depression.

While most of the literature that we came across in the Economics journals focuses on parental investments, in recent times, there is an emerging literature on parenting style in the field of Economics. Fiorini and Keane (2014) attempted to estimate a production function for child skills, using the Longitudinal Study of Australian Children (LSAC) data. They aimed to determine the most productive parental inputs for cognitive skills of children like reading and logical reasoning skills and non-cognitive skills like behavioral skills, emotional skills, and social skills. They find that for cognitive skills, time spent with parents and also other people, on educational activities is the most productive input. However, the allocation

of children's time does not significantly affect the non-cognitive skills of kids in their sample. Instead, parenting style variables like mother warmth and mother's effective discipline are the most productive parental inputs for non-cognitive skills. More specifically, more effective discipline leads to fewer behavioral issues, better social skills, and fewer emotional problems. Higher maternal warmth is also positively related to better social skills. Because authoritative parenting includes a balance of emotional warmth, engagement, and discipline, they conclude that authoritative parenting contributes to better behavioral outcomes. Excessive leniency or excessive harshness can lead to worse behavioral outcomes.

Ermisch (2008) utilizes the Millennium Cohort Study (MCS) to demonstrate that differences in children's cognitive and behavioral development, by parents' socio-economic status, emerge by age 3. Through the production function approach and 3SLS estimation, they discover that parental investments such as reading to the child at least several times a week and taking the child to the library have significant positive effects on the behavior of the child. In addition, a structured parenting style improves the behavior of the child. In a structured parenting style, rules are strictly enforced and parents ensure that their children follow a regular meal time and sleeping routine Also, parenting style has a greater impact on relationships with peers than on cognitive skills.

Deng and Tong (2020) explore the impact of parenting style on child non-cognitive outcomes, using data from China Family Panel Studies (CFPS). To measure non-cognitive skills, the authors construct the following measures: Rosenberg self-esteem scale, locus of control, and emotional stability. The locus of control measures the degree to which an individual considers success or failure as being dependent on one's own action, instead of external circumstances beyond one's control. For parenting style, the authors construct the following measures: Respectful Parenting index and Disciplinary Parenting index. The Respectful Parenting index is constructed from questions related to how the parents communicate with their child and whether the parents respect their child or not. The Disciplinary Parenting index is constructed from questions related to how the parents discipline their children. The authors also construct parental investment measures, which are based on questions related to time and material investments that parents made for their children, such as the frequency of reading to their child or how much money they spent on

the child's education in the last 12 months. The authors found evidence that an increase in the Respectful Parenting index is associated with an increase in self-esteem, locus of control, and emotional stability. In contrast, an increase in the Disciplinary Parenting index is associated with a decrease in the locus of control. This indicates that when parents set strict limits for children such as requiring the child to complete homework or restricting the type of television shows that the child can watch, it reduces the motivation and determination in children to take control over their lives. The Disciplinary Parenting index did not have a significant association with self-esteem and emotional stability. Additionally, parental time and material investment are positively associated with self-esteem. Also, parental time investment is positively associated with locus of control whereas parental material investment is negatively associated with the emotional stability of the children.

Zhang et al. (2020) investigate the role of parenting styles in the cognitive and socio-emotional skills of adolescent children, by utilizing data from the China Education Panel Survey (CEPS). To measure the cognitive skills of adolescents, the authors utilized the following indicators: standardized cognitive skill test scores and the normalized examination scores in Chinese, Mathematics, and English. To measure the socio-emotional skills of adolescents, they construct the following indicators: depression, self-confidence, motivation, and extraversion. The authors categorize parents as authoritarian, authoritative, permissive, and neglectful, based on their demandingness and responsiveness. They defined parents as highly demanding if the parents set high standards for their children's behavior and make efforts to ensure that their children meet those standards. They defined parents as highly responsive if the parents are sensitive to their children's emotional needs. Authoritative parents are highly demanding and highly responsive while authoritarian parents are high on demandingness and low on responsiveness. Permissive parents are low on demandingness and high on responsiveness, whereas neglectful parents are low on both demandingness and responsiveness. The results exhibited a positive relationship between parents' demandingness and exam test scores while there is no significant relationship between parents' demandingness and standardized cognition test scores. In contrast, there is a positive relationship between parents' responsiveness and children's academic performance as well as standardized cognitive test scores. In addition, parents' responsiveness has a significant association with depression, self-confidence, motivation, and extraversion, while parents'

demandingness is positively related to only motivation. The authors also explored possible mechanisms through which parenting style affects their children's cognitive and socio-emotional outcomes. They show that highly demanding parents have greater control over their children's time allocation so they ensure that their children spend less time on leisure activities and more time on their studies, which results in better cognitive outcomes. Moreover, authoritative parents ensure that their children allocate more time to structured leisure activities such as art classes, helping parents with house chores, and participating in winter or summer camps during holidays. Furthermore, parents who are highly responsive and highly demanding have more frequent interaction with school teachers, which helps in improving their children's cognitive and socio-emotional skills.

Cobb-Clark et al. (2019) also attempted to model and empirically test a production function of human development but here, they explicitly focus on parenting style as a key input. Along with the three types of parenting styles: permissive, authoritarian, and authoritative, they include a fourth type of parenting style defined as 'disengaged', in which parents exhibit both low levels of warmth and control towards their children. They utilize the Youth-in-Focus (YIF) Dataset, which contains variables on youth outcomes, household characteristics, and parent-child interactions for Australian youth. From Principle Component Analysis (PCA), they construct two indexes of parenting style: respectful and monitoring. They find that the monitoring component of parenting style is negatively correlated with socioeconomic disadvantage because the stress associated with poverty leads to ineffective implementation of parental control. In more socioeconomically advantaged families, parents are more likely to monitor their children effectively. Their purpose is to determine the relationship between parenting style and youth outcomes such as high school completion, university entrance scores, non-cognitive skills like locus of control, and risky behavior like drug abuse, early pregnancies, drinking problems, and so on. They discover that more respectful parenting is significantly related to a higher possibility of graduating from high school, higher university entrance scores, a more internal locus of control, and less risky behavior. In addition, their results are consistent with the evidence that effective parenting can help in protecting children from the negative effects of socioeconomic disadvantage. On the other hand, more monitoring parenting style has a significant and negative relationship with risky outcomes but it is not significantly related to the likelihood

of graduating from high school, university entrance scores, and locus of control. Because the authoritative parenting style includes a high level of both respect and monitoring, they conclude that the positive youth outcomes come mostly from the respectful aspect of authoritative parenting, Moreover, they find that both time-intensive parental investments such as reading to children at night when they were younger and goods-intensive parental investments such as helping the children out with money, are positively related with youth outcomes.

Moroni et al (2019) made an effort to estimate the production function for the socio-emotional and cognitive skills of children aged between 6 and 11. They aimed to evaluate the relationship between parental inputs such as sensitive parenting, routine parenting, and maternal time investment, and the child outcomes mentioned above, in middle childhood, by utilizing the data of the UK Millennium Cohort Study (MCS). The Sensitive parenting index reflected how harsh/sensitive the parent acted when the child misbehaved. The Routine parenting index reflected how strict the parent was in implementing a routine for their child. They found that children with low socio-emotional skills in early childhood are more vulnerable to a decrease in sensitive parenting later on, relative to those with high socio-emotional skills, whereas children with high socio-emotional skills in early childhood experienced an increase in their socio-emotional skills, as parents adopted a more sensitive parenting style later on. Thus, their evidence suggests complementarity between parental inputs and early socio-emotional skills, but only for high initial values for parental inputs. Moreover, they found substitutability for low levels of parental inputs, which contribute to a stressful home environment. They also found that for girls, an increase in sensitive parenting, mothers' mental health, and parental time investments led to a significant decrease in the gaps in socio-emotional skills in middle childhood.

MacMillan and Tominey (2020) tried to assess whether the policy reform in England, which increased the school leaving age, in 1972, i.e. RoSLA, significantly changed parental inputs. They further attempted to determine the role of these parental inputs in the transmission of the effects of the policy on the cognitive outcomes of children, by exploiting the Avon Longitudinal Study of Parents and Children (ALSPAC) dataset. The RoSLA policy allowed mothers to attain at least a basic level of educational qualifications before leaving

the schooling system. They found that maternal investments such as buying home learning resources for children, increase for treated mothers in the sample. Such investments contribute to better cognitive outcomes in early childhood. On the other hand, parenting style and time spent with children did not significantly change as a result of the policy. Consequently, the socio-emotional skills of the children were not affected by the policy.

Some authors analyze the relationship between parenting style and child outcomes through a game-theoretic framework. Cosconati (2009) developed a model in which parents choose how strict they will be on the limits they set on their children's leisure activities such as curfew time, types of shows and movies they can watch, and who are they allowed to hang out with. Parents can choose three parenting styles. They can impose strict limits by enforcing binding constraints on the leisure activities of their children; they can set permissive limits by setting the limits together with the child, or they can choose to set no limit on their child's leisure time at all. The children then decide the time they spend studying. The author estimates the model by Maximum Likelihood, using the data from the National Longitudinal Study of Youth 1997 (NLSY97), which provides information about youth and their parents living in the US. He finds out that only children with low initial capital, spend more time studying if their parents impose a strict parenting style. A strict parenting style does not work on children who already have a high initial level of capital.

Burton et al. (2002) further contributed to this literature by estimating a 3SLS simultaneous equations model relating child behavior with parenting style and vice versa. They argued that parenting style is also influenced by the child's behavior so a unidirectional model is not sufficient. By running the Hausman test, they confirm that bad parenting does not exogenously determine child behavior and similarly, child behavior does not exogenously determine parenting style. Their results exhibited a significant relationship between parenting style and child behavior. They also showed that parenting style is affected by child behavior and also the stresses in the lives of parents such as their financial status.

2.5 Our Contribution

The purpose of writing this thesis is to contribute to the growing body of research that has been carried out on the relationship between parenting style and child skills. Even though the data contains parenting style variables for children aged 8 and youth aged 10 to 16 as well, we particularly restrict our analysis to children aged 5, because younger children are more malleable to their home and environment and less likely to be influenced by their external environments such as school environment, peers and neighborhood quality. Most of the literature that we reviewed in the Economics journals does not analyze the relationship between parenting styles and child outcomes, separately for different age groups. Moreover, we attempt to add to the literature by analyzing the differences in the association between parenting style and child socio-emotional outcomes, for different income groups. Furthermore, we have not yet come across a study on parenting styles, which has used the British Understanding Society dataset.

3 Data

We utilized the British Understanding Society Data for our analysis. The Understanding Society collects data from UK households over a long period. It is a continuation of the British Household Panel Survey (BHPS), which lasted from 1991 to 2009. The main differences are that it is more extensive and contains a wider set of questions. Up till now, it consists of 11 Waves. Wave 1 was completed in 2009, and Wave 11 was completed in 2020.

The overall study has the following sample components to allow research of different sub-groups over time and location or geography: The General Population Sample (GPS), The Ethnic Minority Boost Sample (EMBS), The Immigrant and Ethnic Minority Boost Sample (IMBS), and the BHPS. The GPS consists of a clustered and stratified probability sample of approximately 24,000 households in the UK in 2009-2010, with a simple random sample of approximately 2000 households in Northern Ireland in 2009. The EMBS consists of approximately 4000 households, which were selected from areas of high ethnic minority concentration in 2009-2010, where at least one member was from an ethnic minority group. The IMBS was added in Wave 6. It comprises approximately 2900 households selected from areas of high ethnic minority concentration in 2015. At least one of the members of the households was either from an ethnic minority group or born outside the UK. The BHPS sample was added in Wave 2. It consists of approximately 8000 households from the BHPS sample (Institute for Social and Economic Research, 2021).

Sample members are interviewed every year as long as they continue to live in the UK and agree to participate. Every individual is interviewed after approximately every 12 months. For example, Wave 2 interview for every individual is conducted approximately one year after the Wave 1 interview, and so on (Institute for Social and Economic Research, 2021).

Interviews are usually conducted face-to-face by trained interviewers in respondents' homes or online by the respondents themselves. Respondents answer each question voluntarily. The core sample consists of all members of the households selected in the first wave and their descendants. These households and their members are interviewed in every

subsequent wave to observe how things have changed over time. Those who join the household in the subsequent wave do not become part of the core sample, but they are interviewed as long as they live with at least one member of the core sample (Institute for Social and Economic Research, 2021).

All members of the household are interviewed in the study, and information related to family life, income, wealth and expenditures, civic participation, health, and well-being, is collected from the participants. The questionnaires are divided into three categories: household questionnaire, adult questionnaire for participants above 16 years, and youth questionnaire for children aged between 10 and 15 years. Any knowledgeable adult in the household can fill the household enumeration grid. It identifies household members and collects basic information about them. The household questionnaire is answered by the person who owns or rents the accommodation. It contains questions related to the whole household, such as rents, mortgage, expenditure on heating, ownership information, and so on. The adult questionnaire is completed individually by all household members aged 16 and above. The adults' questionnaire also contains a module containing questions for children under ten years, which is completed by parents or guardians. During face-to-face interviews, interviews ask most of the questions other than the self-completion questionnaire, which is filled by the respondents. Household members aged between 10 and 15 years complete a short self-completion youth questionnaire with permission from their parent or guardian. Once they become 16 years old, they are eligible for the adults' interview (Institute for Social and Economic Research, 2021).

We selected this dataset because it contains several useful variables on parenting practices and parenting style, variables related to non-cognitive skills of children aged 5 and 8, and other variables like children's health and mother's education, which we used as covariates. We decided to restrict our sample to children aged five because children who are eight years old have already spent a significant time in school. They are highly likely to be influenced by factors other than parental inputs, which might be difficult to account for in our analysis.

We started from Wave 3 because variables related to child development and parenting style are available from Wave 3 onwards. Initially, we ran our analysis on Wave 3. Later, we

aggregated data for children aged five from all Waves while considering the time period they were interviewed. Our sample from Wave 3 consists of 779 observations, and the aggregated sample of all Waves consists of 4312 observations. Note that the aggregated sample is not panel because we are not interested in following the same children over time. Our aggregated sample contains information on only children aged five from all waves.

Table 1 briefly describes all the variables used in our analysis. The detailed descriptions of the variables of interest are mentioned in Sections 3.1, 3.2, 3.3, and 3.4. We describe the construction of the variables used in our model in the subsequent subsections.

3.1 Child Non-Cognitive Skills

The outcome variable is socio-emotional skills of the child, which is captured by the SDQ Total Difficulties Score. SDQ indicators have been widely used in the literature to measure socio-emotional outcomes (Kuppens & Ceulemans, 2019; Moroni et al, 2019).

The SDQ consists of 25 items, which are related to positive and negative behaviors of the child. These items are aggregated to form the following SDQ subscales: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and pro-social behavior. The SDQ Total Difficulties Score is constructed by aggregating the SDQ subscales, except for pro-social behavior. It takes a value between 0 and 30. The higher the SDQ Total Difficulties Score, the more problems the child is facing, in terms of socio-emotional behavior.

3.2 Main Inputs

We divide the main input variables for child skills, into three categories: parenting style, parental time investment and routine of the child. It is important to note that the parenting style and parental time investment variables, discussed below are only available in Waves 3, 5, 7, 9 and 11 i.e. odd-numbered waves, while the SDQ Total Difficulties score of the child is available in all waves.

3.2.1 Parenting Style

The psychology literature on parent-child relationships has classified parenting style into three types: authoritarian, authoritative and permissive. Authoritarian parents tend to be harsh towards their children because they frequently shout at their children, and even resort to corporal punishment, if they do not obey them. They rarely express verbal or physical affection towards their children. On the other hand, authoritative parents frequently express affection and warmth towards their children. They try not to discipline their children through harsh methods like yelling, slapping and spanking.

The following questions were asked to mothers who have children aged below 16 years:

- Praisekid: How often do you praise your children?
- Cuddlekid: How often do you cuddle or hug your children?
- Yellkid: How often do you shout at your children?
- Slapkid: How often do you spank or slap your children?

Parents had to answer these questions by choosing the following options: Never, Seldom, Sometimes or Very often. We transformed these variables into binary variables such that, 1 = Frequently and 0 = Not Frequently.

The variables Praisekid and Cuddlekid reflect the level of warmth and affection mothers show to their children so we utilized them to construct the following binary variables related to warmth: *Warmth0*, *Warmth1* and *Warmth2*. *Warmth0* takes the value 1 if both Praisekid and Cuddlekid are equal to 0 i.e. mothers neither praise their children frequently, nor do they cuddle or hug their children frequently. *Warmth1* takes the value 1 if either Praisekid is equal to 1 and Cuddlekid is equal to 0, or Praisekid is equal to 0 and Cuddlekid is equal to 1 i.e. mother either praises or hugs/cuddles the child frequently but not both. *Warmth2* takes the value 1 if both Praisekid and Cuddlekid are equal to 1 i.e. mother both praises the child and hugs the child frequently. We can also refer to Warmth0, Warmth1 and Warmth2 as low, medium and high levels of maternal warmth, respectively.

We also construct binary variables related to harshness, by utilizing Yellkid and Slapkid: *Harshness0*, *Harshness1* and *Harshness2*. *Harshness0* takes the value 1 if both

Yellkid and Slapkid are equal to 0 i.e. mothers neither slap/spank their children frequently, nor do they yell/shout at their children frequently. *Harshness1* takes the value 1 if either Yellkid is equal to 1 and Slapkid is equal to 0, or Yellkid is equal to 0 and Slapkid is equal to 1 i.e. mother either slaps/spank or yells/shouts at the child frequently but not both. *Harshness 2* takes the value 1 if both Yellkid and Slapkid are equal to 1 i.e. mother both slaps/spanks the child and yells/shouts at the child frequently. We can also refer to Harshness0, Harshness 1 and Harshness 2 as low, medium and high levels of maternal warmth, respectively.

Parents who exhibit high levels of warmth and low levels of harshness have a predominantly authoritative parenting style. In contrast, parents who exhibit low levels of warmth and high levels of harshness have a predominantly authoritarian parenting style.

We expect a positive association between parental harshness and children's socio-emotional problems and a negative association between parental warmth and children's socio-emotional problems.

3.2.2 Parental Time Investments

Based on the methodology of Fiorini and Keane's work (2014), we construct the *Educational Time Investment* variable by utilizing the following variables:

- How often parents help child with homework?
- How often parents read to their child?
- How often parents talk about important matters with the child?

The above variables are categorical variables so we transformed them into binary variables. We summed up the individual binary variables and then divided it by 3, to normalize it.

Through a similar procedure, we construct the *Non-educational Time Investment* variable, using the following variables from the questionnaire:

- How often parents have dinner with their child?

- How often parents and children spend time together on leisure activities or outings outside the home such as going to the park or zoo, going to the movies, sports or to have a picnic?

3.2.3 Routine of Child

The following questions give us an idea about how much of a regular routine do the children follow:

- mealsreg: Child has meals at regular times
- bedreg: Child goes to bed at a regular time

We construct the following binary variables related to routine of the children: *Routine0*, *Routine1* and *Routine2*. *Routine0* takes the value 1 if both mealsreg and bedreg are equal to 0 i.e. child neither goes to bed regularly, nor has meals at regular times. *Routine1* takes the value 1 if either mealsreg is equal to 1 and bedreg is equal to 0, or mealsreg is equal to 0 and bedreg is equal to 1 i.e. child either goes to bed regularly, or has meals at regular times, but not both. *Routine2* takes the value 1 if both mealsreg and bedreg are equal to 1 i.e. child both goes to bed regularly and has meals at regular times. These variables reflects how successful parents are in disciplining their children.

3.3 Covariates

Apart from the main parental inputs, we take into account mother's characteristics like her general health condition, mental health condition, whether she pursued higher education or not and whether she is earning money through a job, own business or family business. Mother's mental health condition can be captured by the General Health Questionnaire (GHQ) Caseness score. This measure captures symptoms of depression, anxiety, social dysfunction and lack of confidence (Tseliou, 2018). This measure takes a value between 0 and 12. The higher the value, the more distressed is the mother.

Moreover, we include child characteristics like child's long standing health condition, gender of the child and whether the child has a sibling or not, into our analysis.

Furthermore, we account for the subjective financial situation. Respondents were asked the following question: "How well you say you yourself are managing financially these days?" They answered by mentioning whether they are living comfortably or finding it difficult to manage. We use this information to construct a dummy variable, which takes the value 1, if the respondents find their financial situation difficult to manage, 0 if the respondents are living comfortably.

3.4 Descriptive Statistics and Correlations

Table 2 presents summary statistics of all the variables we used in our model, for children aged 5, in Wave 3. We observe that the average SDQ Total Difficulties Score is 8.33, which is less than 50% of the total score. For 90% of children in the sample, mothers frequently express verbal or physical affection, while for 1.9% of children, mothers do not frequently express verbal or physical affection. 4.66% of the children in the sample do not experience harsh behavior from their mothers whereas 15.5% of the children are slapped or spanked and yelled at, by their mothers.

83.7% of the children in the sample have their dinner and go to bed at regular times, while 4.88% of the children do not follow a regular dinner or bed time routine.

The mean educational time investment value is 0.672, which means that on average, parents do at least one of the following educational activities with the child frequently: doing homework with them, reading to them and talking about important matters with them. The mean of the non-educational time investment value is 0.630, which means that on average, parents either have dinner with their child regularly or frequently enjoy leisure activities with them.

On average, mothers in the sample do not face frequent symptoms of mental distress. 86.4% of the mothers reported their general health as good. 38.5% of the mothers have pursued higher education, and 60.4% of mothers are earning money through paid employment, self-employment or family business. 47.2% of the respondents mentioned that they were finding it difficult to manage their financial situation.

48.5% of the children in the sample are female and 83.8% of the children have at least one sibling in the house. 15.7% of the children face a long-standing health condition.

In Tables 3a and 3b, we observe that among those parents who exhibit a medium level of warmth towards their children, around 32% exhibit a medium level of harshness. Additionally, among the parents who show a high level of harshness towards their children, approximately 82% also show a high level of warmth towards their children. This is why, we evaluate the effects of maternal warmth and harshness on child outcomes separately, instead of constructing a single indicator.

We can do a simple correlation analysis by observing the Graphs 1-8. We observe that the SDQ Total Difficulties Score is negatively correlated with the level of warmth displayed by mothers, and positively correlated with the level of harshness displayed by parents. Children whose mothers express both verbal and physical affection regularly, have a lower average SDQ Difficulties score than those children whose mothers do not show warmth regularly. Also, children whose mothers practice corporal punishment and shout at them, have a higher average SDQ Difficulties score than those whose mothers are less harsh towards them. Additionally, children who follow a regular mealtime and sleeping routine, have a lower SDQ Difficulties score than those who do not follow a regular mealtime and sleeping routine. Overall, both parental educational and non-educational time investment is negatively correlated with the SDQ Total Difficulties score. We cannot infer causality from this analysis so we will attempt capture a more in-depth insight into the association between SDQ Total Difficulties score and parental inputs, through the methodology explained in Section 3.

Next, we check the correlation between equalized household income and SDQ Total Difficulties score by running a two sample t-test. We divide the sample into two groups: one group has the household income below the median level of income and the other group has the household income above the median level of income. Table 4a shows the results of the two sample t-test of SDQ Total Difficulties score, over the two income groups. It shows a significant difference in the average SDQ Total Difficulties score between the two income groups. The higher income group has a lower SDQ Total Difficulties score than the lower income group. We also want to check the correlation between equalized household income and maternal warmth as well as maternal harshness. Table 4b and 4c show the results of the two sample t-test of Warmth2 and Harshness2, over the two income groups. We observe that more people in the lower income group have a high level of harshness and a low level of warmth, than those in the higher income group.

Table 1: Variable Description

Variable Name	Variable Description
SDQ Total Difficulties Score	0=Least Difficult to 30=Most Difficult
Warmth0	Low Level of Warmth 1 = Mother neither praises the child nor hugs/cuddles the child frequently 0 = Otherwise
Warmth1	Medium Level of Warmth 1 = Mother either praises or hugs/cuddles the child frequently but not both 0 = Otherwise
Warmth2	High Level of Warmth 1 = Mother both praises the child and hugs the child frequently 0 = Otherwise
Harshness0	Low Level of Harshness 1 = Mother neither shouts at the child nor slaps/spanks the child frequently 0 = Otherwise
Harshness1	Medium Level of Harshness 1 = Mother either shouts or slaps/spanks the child frequently but not both 0 = Otherwise
Harshness2	High Level of Harshness 1 = Mother both shouts at the child and slaps/spanks the child frequently 0 = Otherwise
Routine0	1 = Child neither goes to bed regularly, nor has meals at regular times 0 = Otherwise
Routine1	1 = Child either goes to bed regularly, or has meals at regular times, but not both 0 = Otherwise
Routine2	1 = Child both goes to bed regularly and has meals at regular times 0 = Otherwise
Educational Time Investment	Time spent with parents on educational activities e.g. homework, reading to child, talking about important matters
Non-educational Time Investment	Time spent with parents on non-educational activities e.g. leisure time, dinner with children
Subjective Financial Situation	1=Difficult 0=Not Difficult
General Health of Mother	1=Good 0=Bad
Mother's Mental Health	0=Least Distressed to 12=Most Distressed
Mother has Higher Education?	1=Yes 0=No
Is the mother earning?	Is the mother earning from paid employment, self-employment or family business 1=Yes 0=No
Child long-term health condition	Does the child have any long-standing health condition? 1=Yes 0=No
Child has any sibling?	1=Yes 0=No
Female Child	1=Female Child 0=Male Child

Table 2: Descriptive Statistics (Wave 3)

Variable	Obs	Mean	Std. Dev.	Min	Max
SDQ Total Difficulties Score	779	8.334	5.399	0	30
Warmth0	779	.019	.138	0	1
Warmth1	779	.08	.271	0	1
Warmth2	779	.901	.299	0	1
Harshness0	779	.466	.499	0	1
Harshness1	779	.379	.485	0	1
Harshness2	779	.155	.362	0	1
Routine0	779	.049	.216	0	1
Routine1	779	.114	.318	0	1
Routine2	779	.837	.37	0	1
Educational Time Investment	779	.673	.182	0	1
Non-educational Time Investment	779	.63	.318	0	1
General Health of Mother	779	.864	.343	0	1
Mother's Mental Health	779	1.999	3.138	0	12
Mother has Higher Education?	779	.385	.487	0	1
Is the mother earning?	779	.605	.489	0	1
Child long-term health condition	779	.157	.364	0	1
Child has any sibling?	779	.838	.368	0	1
Female Child	779	.485	.5	0	1
Subjective Financial Situation	779	.472	.5	0	1
Equalized Household Income	779	1462.098	982.078	0	13739.08

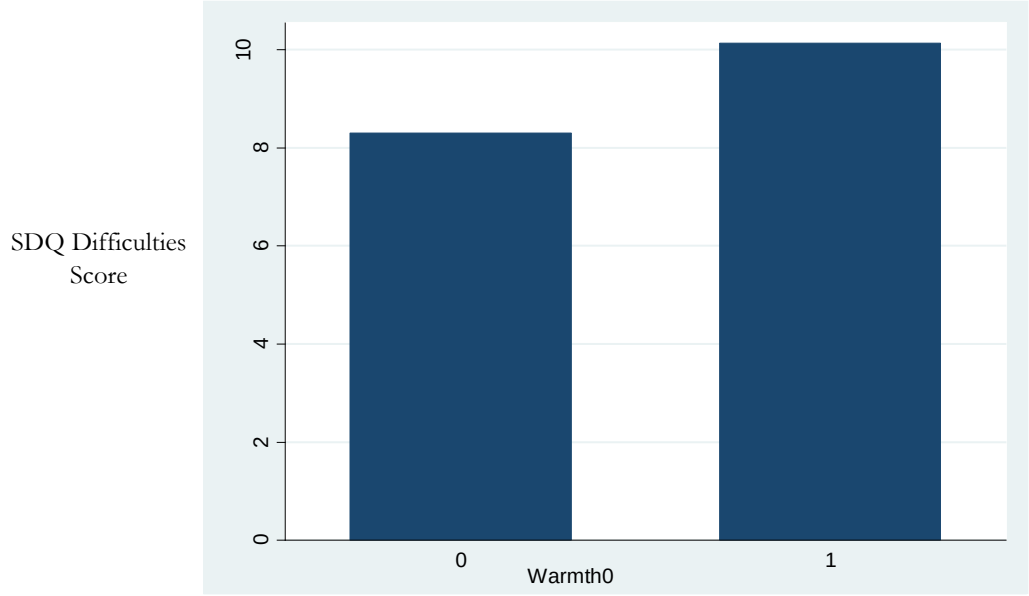
Table 3a: Tabulation of Warmth1 Harshness1

Mother only praises or hugs/cuddles the child frequently but not both	Mother only slaps/spanks or shouts at the child frequently but not both		
	0	1	Total
0	72.89	27.11	100.00
1	67.87	32.13	100.00
Total	72.37	27.63	100.00

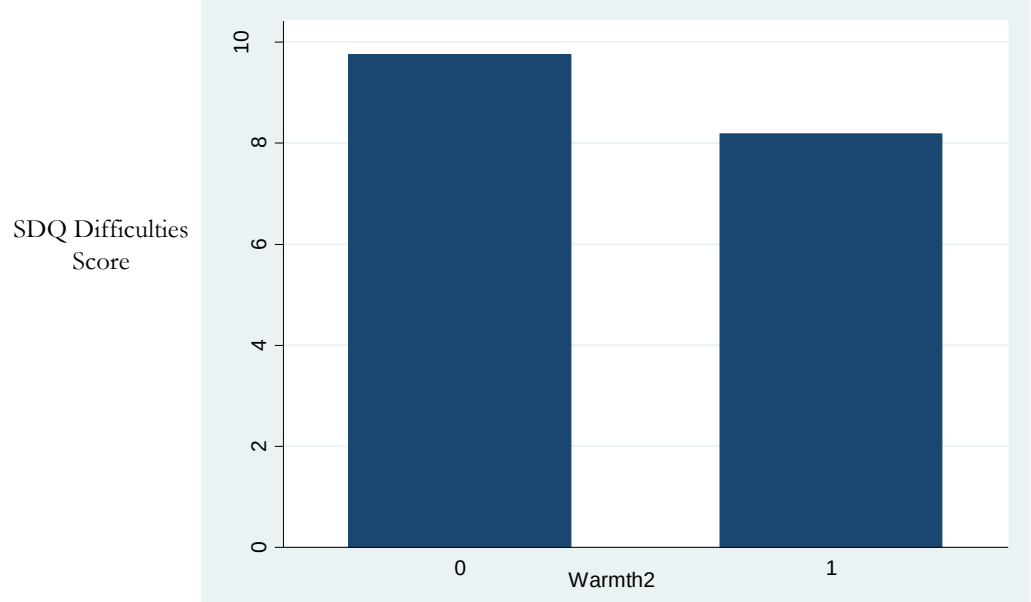
Table 3b: Tabulation of Warmth2 Harshness2

Mother both praises and hugs/cuddles the child frequently	Mother both slaps/spanks and shouts at the child frequently		
	0	1	Total
0	14.94	18.36	15.20
1	85.06	81.64	84.80
Total	100.00	100.00	100.00

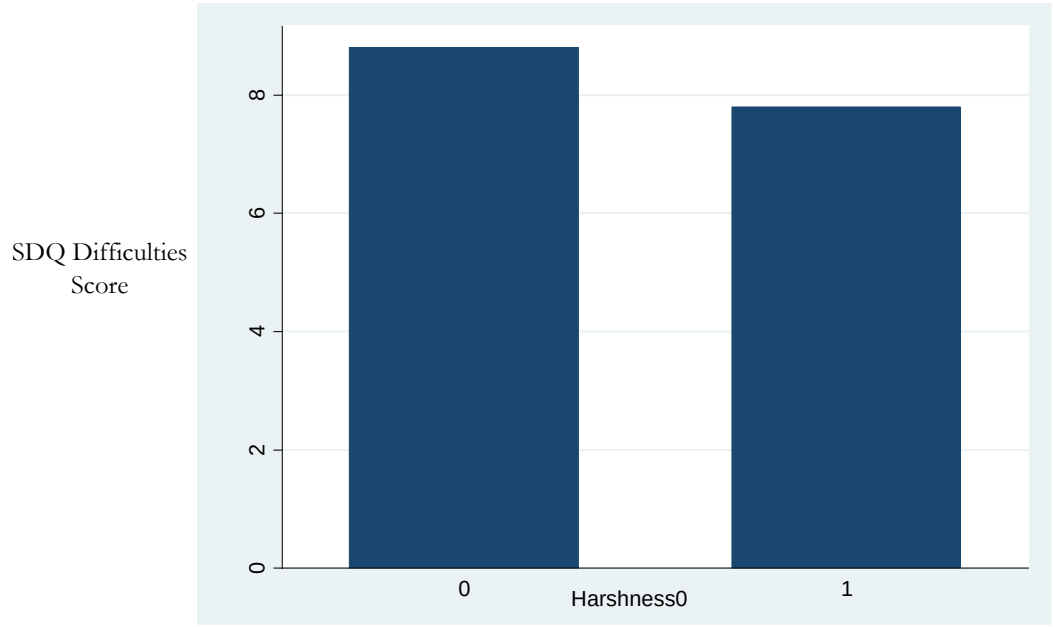
Graph 1: Distribution of Average SDQ Difficulties Score over Warmth0



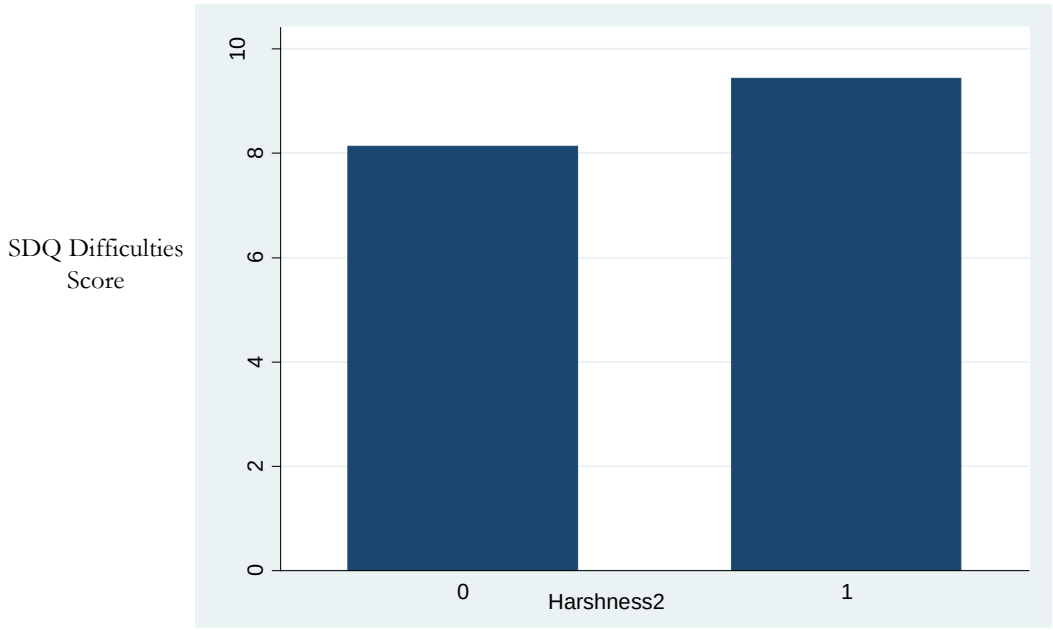
Graph 2: Distribution of Average SDQ Difficulties Score over Warmth2



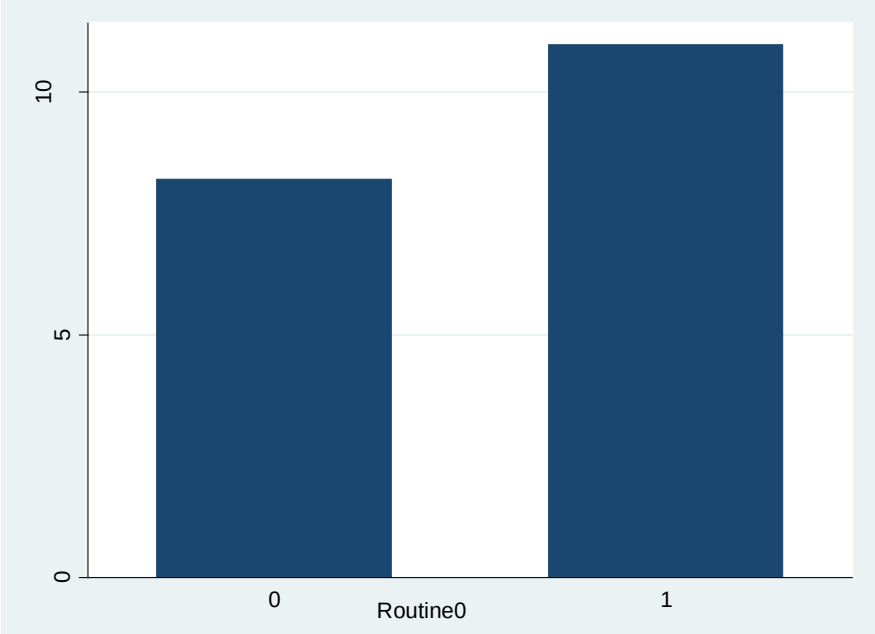
Graph 3: Distribution of Average SDQ Difficulties Score over Harshness0



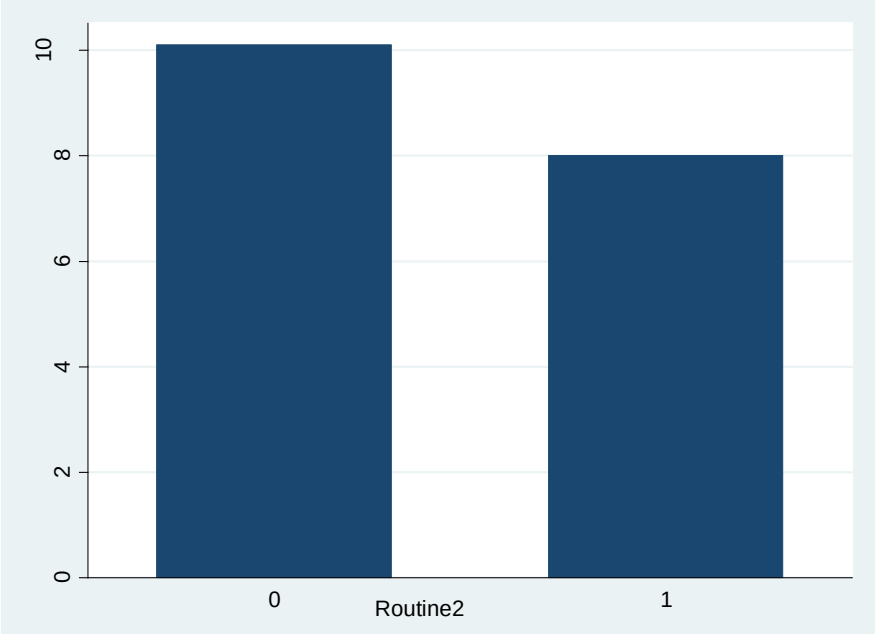
Graph 4: Distribution of Average SDQ Difficulties Score over Harshness2



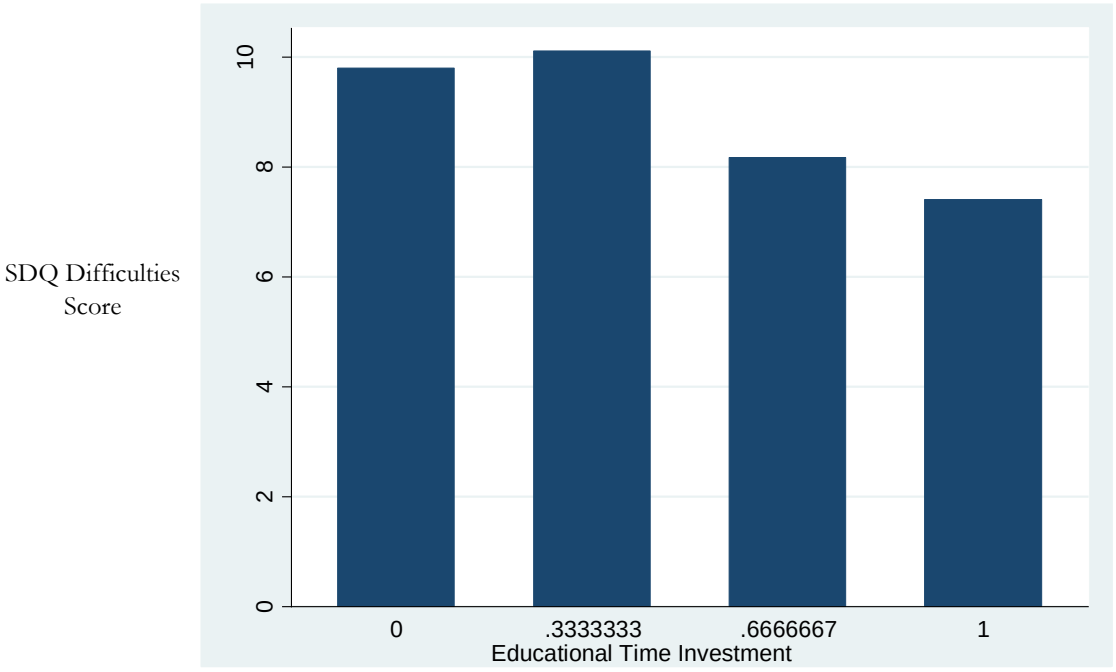
Graph 5: Distribution of Average SDQ Difficulties Score over Routine0



Graph 6: Distribution of Average SDQ Difficulties Score over Routine2



Graph 7: Distribution of Average SDQ Difficulties Score over Educational Time Investment



Graph 8: Distribution of Average SDQ Difficulties Score over Non-educational Time Investment

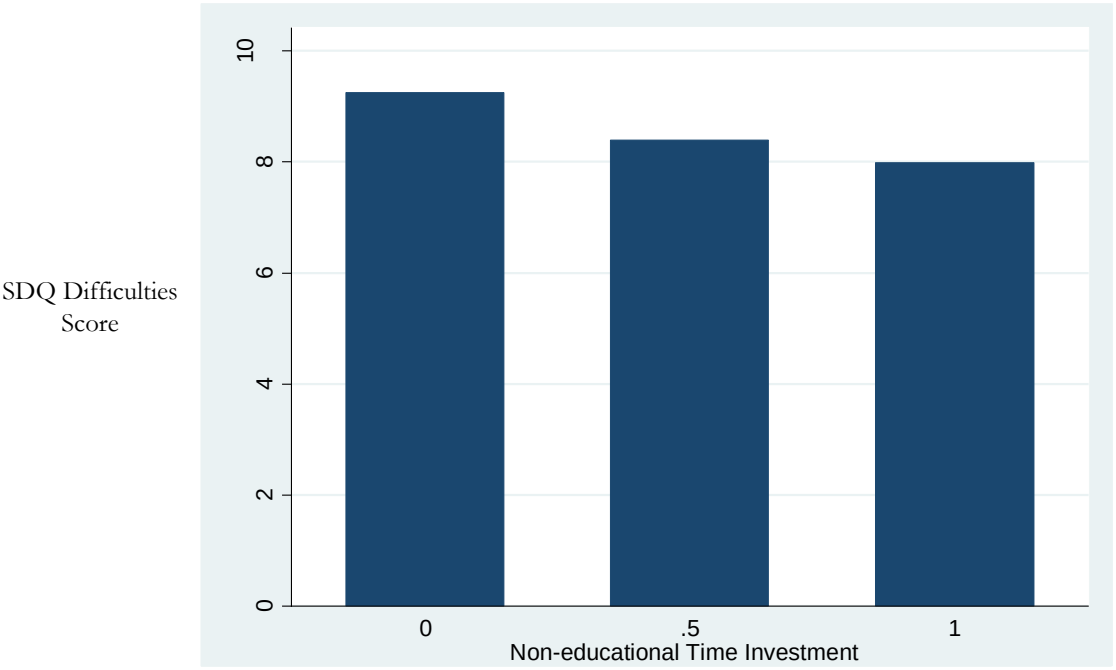


Table 4a: t-test of Mean SDQ Total Difficulties Score, over Lower and Higher Income Groups

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Lower	3,143	9.150811	.1042019	5.841818	8.946501	9.355122
Higher	2,684	7.632638	.1008986	5.227289	7.434791	7.830485
combined	5,827	8.451519	.0735959	5.617928	8.307243	8.595794
diff		1.518173	.1463173		1.231337	1.80501

diff = mean(Lower) - mean(Higher) t = 10.3759
Ho: diff = 0 degrees of freedom = 5825

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Table 4b: t-test of Warmth2, over Lower and Higher Income Groups

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Lower	6,299	.8206064	.0048347	.383712	.8111288	.8300841
Higher	6,282	.8753582	.0041678	.3303386	.8671878	.8835285
combined	12,581	.8479453	.0032014	.3590882	.84167	.8542206
diff		-.0547517	.0063845		-.0672663	-.0422372

diff = mean(Lower) - mean(Higher) t = -8.5758
Ho: diff = 0 degrees of freedom = 12579

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 1.0000

Table 4c: t-test of Harshness2, over Lower and Higher Income Groups

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Lower	6,295	.0881652	.0035739	.2835575	.0811591	.0951713
Higher	6,280	.063535	.0030783	.2439422	.0575006	.0695695
combined	12,575	.0758648	.0023613	.2647922	.0712363	.0804933
diff		.0246302	.0047177		.0153828	.0338776

diff = mean(Lower) - mean(Higher) t = 5.2208
Ho: diff = 0 degrees of freedom = 12573

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

4 Empirical Methodology

In order to evaluate the relationship between parenting style and socio-emotional outcomes of young children aged 5, we need to take into the account other parental inputs and covariates, which have been described in Chapter 2. For this thesis, we ran an Ordinary Least Squares (OLS) regression model to analyze the association between parenting style and child socio-emotional outcomes.

We conduct the Breusch Pagan test, to test for heteroskedasticity. The results of the test below, indicate the presence of heteroskedasticity. We used clustered standard errors, which are robust to heteroskedasticity.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
      Ho: Constant variance
      Variables: fitted values of total_diff
      chi2(1)      =    36.56
      Prob > chi2  =   0.0000
```

We break down our analysis in a number of steps.

4.1 Baseline Model

For the baseline model, we run the following specification in STATA:

$$(1) \quad y_i = \beta_0 + \beta_1 Warmth0_i + \beta_2 Warmth2_i + \beta_3 Harshness0_i + \beta_4 Harshness2_i + \beta_5 Routine0_i + \beta_6 Routine2_i + \beta_7 Educ\_time_i + \beta_8 Noneduc\_time_i + X_i' + u_i$$

y_i is the outcome variable, which is the SDQ Total Difficulties Score for child i. Our independent variables of interest are $Warmth0_i$, $Warmth2_i$, $Harshness0_i$ and $Harshness2_i$, which indicate parenting style. $Warmth1, Harshness1\ and\ Routine1$ are the base groups of *Warmth*, *Harshness* and *Routine* binary variables respectively. *Educ_time* and *Noneduc_time* are Parental Educational and Non-educational Time Investment variables respectively. X_i' is the matrix of covariates in our model, in order to decrease the likelihood of endogeniety. u_i captures the unobserved factors affecting the socio-emotional skills of the child. We are particularly interested in estimating $\beta_1, \beta_2, \beta_3\ and\ \beta_4$.

More specifically, we run the baseline specification for Wave 3 so we want to estimate the below estimation:

$$(2)\quad y_{i3} = \beta_0 + \beta_1 Warmth0_{i3} + \beta_2 Warmth2_{i3} + \beta_3 Harshness0_{i3} + \beta_4 Harshness2_{i3} + \beta_5 Routine0_{i3} + \beta_6 Routine2_{i3} + \beta_7 Educ\_time_{i3} + \beta_8 Noneduc\_time_{i3} + X'_{i3} + u_{i3}$$

4.2 Intermediate Steps

Before aggregating the data from all the waves, we run some intermediate steps.

Firstly, we wanted to check whether the pattern of results that we observe for Wave 4, are similar to the results of the baseline specification for Wave3. The problem was that parental input variables like warmth, harshness and parental time investment were not available in Wave 4, so we decided to consider these parental input variables for Wave 3, for children aged 5, in Wave 4. Thus, we run the specification below, in which the outcome variable is from Wave 4, while most of the parental input variables are from Wave 3.

$$(3)\quad y_{i4} = \beta_0 + \beta_1 Warmth0_{i3} + \beta_2 Warmth2_{i3} + \beta_3 Harshness0_{i3} + \beta_4 Harshness2_{i3} + \beta_5 Routine0_{i4} + \beta_6 Routine2_{i4} + \beta_7 Educ\_time_{i3} + \beta_8 Noneduc\_time_{i3} + X'_{i4} + u_{i4}$$

Secondly, we append the data from Wave 3 and Wave 4, and run the specification (4). It is important to note that while the outcome variable may be from Wave 3 or Wave 4, the parental input variables like warmth, harshness and parental time investment variables are always from Wave 3, regardless of the corresponding outcome variable observation. In the specification (4), t is either 3 or 4. δ_t are the wave binary variables. In this particular specification, it is the binary variable, which takes the value 1, if the observation is from Wave 4, and 0 if the observation is from Wave 3.

$$(4)\quad y_{it} = \beta_0 + \beta_1 Warmth0_{i3} + \beta_2 Warmth2_{i3} + \beta_3 Harshness0_{i3} + \beta_4 Harshness2_{i3} + \beta_5 Routine0_{it} + \beta_6 Routine2_{it} + \beta_7 Educ\_time_{i3} + \beta_8 Noneduc\_time_{i3} + X'_{it} + \delta_t + u_{it}$$

4.3 Aggregated Model

Our aim was to aggregate the data from Waves 3 to 11, and then estimate the following specification:

$$(5)\quad y_{it} = \beta_0 + \beta_1 Warmth0_{it} + \beta_2 Warmth2_{it} + \beta_3 Harshness0_{it} + \beta_4 Harshness2_{it} + \beta_5 Routine0_{it} + \beta_6 Routine2_{it} + \beta_7 Educ\_time_{it} + \beta_8 Noneduc\_time_{it} + X'_{it} + \delta_t + u_{it}$$

We have the SDQ variables for all Waves but the parental input variables, particularly warmth binary variables, harshness binary variables, educational and non-educational time investment variables are only available for Waves 3, 5, 7, 9 and 11 i.e. odd-numbered waves. For children in the odd-numbered waves, we assigned them the parental input variables reported in the same wave, while for children in the even-numbered waves, we assigned them the parental input variables reported in the previous wave. For example, a child, aged 5, in Wave 5 was assigned the parental input variables reported in the same wave i.e. Wave 5. However, a child, aged 5, in Wave 6, was assigned parental input variables reported in Wave 5. Thus, for each child aged 5, the corresponding parental input variables are either reported in the same or previous wave, depending on whether the wave is odd or even-numbered. δ_t are the Wave specific binary variables.

4.4 Additional Specifications

4.4.1 Odd-Numbered and Even Numbered Waves

In addition, we want to check whether the relationship between SDQ Total Difficulties score of children aged 5, and parenting style varies according to when the parenting style is measured. To do that, we aggregated all the odd-numbered waves, and ran specification (5). Then, we aggregated all the even-numbered waves and ran specification (6), mentioned below:

$$(6)\quad y_{it} = \beta_0 + \beta_1 Warmth0_{i(t-1)} + \beta_2 Warmth2_{i(t-1)} + \beta_3 Harshness0_{i(t-1)} + \beta_4 Harshness2_{i(t-1)} + \beta_5 Routine0_{it} + \beta_6 Routine2_{it} + \beta_7 Educ\_time_{i(t-1)} + \beta_8 Noneduc\_time_{i(t-1)} + X'_{it} + \delta_t + u_{it}$$

4.4.2 Income Quartile Groups

Next, we run specification (5) separately for two different income groups because we want to determine whether the relationship between child socio-emotional outcomes and parenting styles is stronger for children living in financially disadvantaged households. For this purpose, we consider the net household monthly income, which is composed of net labor income, miscellaneous income, private benefit income, investment income, pension income and social benefit income. The households in the sample have varying sizes and compositions so we divide the net household monthly income by the OECD-modified equivalence scale for each household. This scale assigns a weight of 1 to the first adult in the household, a weight of 0.5 to each additional adult, and a weight of 0.3 to each child. Then, we divide the sample into two income groups. The lower income group i.e. Income Group 1, consists of children who belong to households with less than the median level of income. The higher income group i.e. Income Group 2, consists of children who belong to households, with equal to or more than the median level of income. We expect children who belong to the lower income group, to be more vulnerable to maternal harshness, than the children who belong to the higher income group.

5 Results

5.1 Baseline Model

Table 5 displays the results of our baseline model, particularly for observations in Wave 3. Column 1 shows the results without the covariates, whereas Column 2, shows the results with the covariates. We observe that including the covariates does not alter the statistical significance of the parental input variables. The Warmth binary variables are not statistically significant, while among the Harshness binary variables, only Harshness0 is statistically significant, and it has a negative sign. This means that children, whose mothers neither hit them, nor yell at them, have a lower SDQ Total Difficulties Score, than the children, whose mothers either hit them, or yell at them, but not both. The SDQ Difficulties Score of children, whose mothers exhibit both physical and verbal forms of harshness is not significantly different from the Score of children, whose mothers exhibit only one form of harshness. In other words, the difference between low and medium level of harshness is statistically significant, while the difference between medium and high level of harshness is insignificant. We can infer from these results, that parental harshness has a stronger effect on socio-emotional skills, than parental warmth.

Among the Routine binary variables, only Routine2 is significant, which means children who go to bed and have their meals, at regular times, have a lower SDQ Difficulties Score, than the children, either go to bed or have their meals, at regular times. Sleeping and meal times are an important component of a child's routine and irregularity in even one of these activities, can negatively affect the socio-emotional skills of the child.

The Educational Time Investment Variable is significant and the sign of its coefficient is negative, which means that the more time parents spend with their children on educational activities like reading to them, doing homework with them and talking about important matters with them, the children face lesser socio-emotional problems. The Non-educational time Investment variable is insignificant.

Mother's General Health variable is statistically insignificant, while the Mother's Mental Health variable is significant and has a positive sign. This means that the more distressed the mother, the higher the SDQ Difficulties Score, ceteris paribus. The rest of the

covariates related to the mother's characteristics are also significant. In particular, children whose mothers have a Higher Education qualification, have a lower SDQ Difficulties Score than the children whose mothers do not have a Higher Education qualification. In addition, children whose mothers are earning an income, have a lower SDQ Difficulties score on average, than children whose mothers are not earning an income.

The child long-term health condition variable is significant and has a positive sign, which means that keeping all other factors fixed, children with a long-standing health condition have a higher SDQ Difficulties score than the children who do not have a long-standing health condition. The SDQ Difficulties score of children with at least one sibling is not significantly different from that of children with no sibling. Female children have a lower SDQ Difficulties score, on average, than male children.

Additionally, children whose parents report their financial situation as difficult, have a higher SDQ score than the children whose parents who did not report their financial situation as difficult.

5.2 Intermediate Specifications

Table 6 presents the results of specifications 3 and 4. The results of both of these specifications are similar, except for Subjective Financial Situation, which is significant for specification 3, but not for 4. Moreover, one of the major differences between the results in **Table 5** and **Table 6** is that the Warmth2 variable is significant in **Table 6**. This means that in **Table 6**, the children who receive a high level of warmth from their mothers in the past, have a lesser SDQ Difficulties score than those who receive a medium level of warmth form their mothers. A possible explanation for this could be that the effect of parental warmth takes some time to show up. Another difference between the results in **Table 5** and **Table 6** is that unlike in **Table 5**, Routine0 is significant and has a positive sign. This means that the children who neither have their meals on time, nor sleep on time, have a higher SDQ Total Difficulties score than the children who either have their meals on time or sleep on time. Additionally, the variable on Non-educational Time Investment is not significant in **Table 5** but it is significant and has a negative sign in **Table 6**. This means that as Non-educational time investment increases, the SDQ Total Difficulties score decreases, ceteris paribus. Also, the General Health of Mother is insignificant in Table 3 but significant and has a negative

sign in **Table 5**. This means that children whose mothers reported their general health condition as good, have a lower SDQ Total Difficulties score than the children whose mothers reported otherwise, keeping everything else constant.

5.3 Aggregated Data

Table 7 presents the estimation results we got from aggregating the data from all Waves. Column 1 shows the results without the Wave Binary Variables, while Column 2 shows the results we got when we included the Wave Binary Variables, to take into account the time fixed effects. We note that including the Wave Binary Variables does not make a difference to the signs and statistical significance of the variables. However, when we compare **Table 7** to the results presented in **Table 5**, we notice that unlike in **Table 5**, Warmth2 is significant and has a negative sign. Both the Routine binary variables are significant. Routine0 has a positive sign, while Routine2 has a negative sign, which means that children who follow a more regular mealtime and sleeping routine, have a lower SDQ Total Difficulties score than those children who do not, ceteris paribus. Unlike in **Table 5**, Non-educational Time Investment variable is significant in **Table 7**, and has a negative sign, which means that higher parental non-educational time investment is associated with lower SDQ Total Difficulties score, keeping all other factors constant. Covariates such mother's general health and child's siblings are not significant in **Table 5**, whereas they are significant and have a negative sign in **Table 7**, keeping everything else fixed. A possible reason for these differences could be the higher number of observations in the regressions we ran for **Table 7**. A higher number of observations reduces the standard error, which increases the t-statistic. This increases the likelihood of rejecting the null hypothesis that the coefficient of the relevant variable is equal to 0. Thus, a statistically insignificant variable can become significant, if the number of observations under consideration increases.

5.4 Additional Specifications

5.4.1 Odd-Numbered and Even Numbered Waves

Next, we wanted to consider parenting styles in the past and present separately so we ran the regressions of data from odd-numbered and even-numbered waves separately. The results of these regressions are presented in **Table 8**. We include the results both with and without the Wave Binary variables. The first two columns in **Table 8** reflect the results of the regression associating SDQ Total Difficulties score in the present, with parenting style variables in the past. The third and fourth columns in **Table 8** represent the results of the regression, associating SDQ Total Difficulties score in the present, with parenting style variables in the past. Firstly, we note that adding the Wave Binary Variables does not make a difference to the statistical significance of our variables of interest. Secondly, we note that none of the Warmth binary variables are significant for odd-numbered waves while Warmth2 is statistically significant at 5% significance level, for even-numbered waves. On the other hand, Harshness0 is statistically significant at 1% for both odd and even-numbered waves whereas Harshness2 is significant for only odd-numbered waves. A possible explanation for these differences could be that the negative impact of maternal harshness is immediate and maternal warmth cannot moderate it instantly. However, maternal warmth does seem to moderate the negative effects of harshness over time, which implies that it can take some time to visibly observe the positive impact of maternal warmth.

5.4.2 Income Groups

Lastly, we wanted to determine whether the impact of parenting style on socio-emotional outcomes of the child, varies with income. **Table 9** presents the results of the regressions we ran separately for income levels below and equal to or above the median level of income. Comparing the results of the lower and higher income groups, we notice that none of the Warmth binary variables are significant for children who belong to the higher income group, whereas Warmth2 is significant at 5% for children who belong to the lower income group. Both the Harshness binary variables are statistically significant for the children in both income groups, but we notice that the magnitudes of the coefficients are slightly higher for the lower income group. These results can be explained by the one of findings of Cobb-Clark (2016) that children who belong to financially disadvantaged households, are more vulnerable to authoritarian parenting. Our results indicate that maternal warmth can mitigate the negative effects of high maternal harshness, in a lower income household.

Table 5: Baseline Model (Wave 3)

	1	2
VARIABLES	SDQ Total Difficulties Score	SDQ Total Difficulties Score
Warmth0	0.208	-0.0306
	(1.469)	(1.433)
Warmth2	-0.954	-1.035
	(0.748)	(0.675)
Harshness0	-0.737*	-0.674*
	(0.420)	(0.394)
Harshness2	0.686	0.479
	(0.581)	(0.544)
Routine0	0.713	0.665
	(1.086)	(0.972)
Routine2	-1.566**	-1.200**
	(0.686)	(0.576)
Educational Time Investment	-3.804***	-2.521**
	(1.051)	(1.003)
Non-educational Time Investment	-0.746	-0.255
	(0.607)	(0.573)
General Health of Mother		-0.556
		(0.560)
Mother's Mental Health		0.355***
		(0.0613)
Mother has Higher Education?		-1.329***
		(0.376)
Is the mother earning?		-0.664*
		(0.388)
Child long-term health condition		1.957***
		(0.495)
Child has any sibling?		-0.437
		(0.498)
Female Child		-1.057***
		(0.361)
Subjective Financial Situation		0.751**
		(0.376)
Constant	13.73***	13.24***
	(1.177)	(1.306)
Observations	779	779
R-squared	0.054	0.169

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Intermediate Steps

	Specification 3	Specification 4
VARIABLES	SDQ Total Difficulties Score	SDQ Total Difficulties Score
Warmth0	-1.958	-1.062
	(1.574)	(1.054)
Warmth2	-1.772**	-1.427***
	(0.834)	(0.522)
Harshness0	-1.165***	-0.891***
	(0.422)	(0.287)
Harshness2	0.734	0.605
	(0.559)	(0.388)
Routine0	2.090*	1.345*
	(1.103)	(0.728)
Routine2	-1.119*	-1.143***
	(0.614)	(0.418)
Educational Time Investment	-2.514***	-2.105***
	(0.808)	(0.582)
Non-educational Time Investment	-1.645***	-0.921**
	(0.629)	(0.422)
General Health of Mother	-1.664**	-1.083**
	(0.673)	(0.429)
Mother's Mental Health	0.256***	0.309***
	(0.0667)	(0.0449)
Mother has Higher Education?	-0.672*	-1.037***
	(0.391)	(0.269)
Is the mother earning?	-0.760*	-0.750***
	(0.410)	(0.280)
Child long-term health condition	2.883***	2.406***
	(0.488)	(0.346)
Child has any sibling?	-0.0495	-0.324
	(0.577)	(0.373)
Female Child	-1.554***	-1.248***
	(0.380)	(0.260)
Subjective Financial Situation	0.462	0.574**
	(0.392)	(0.270)
Constant	15.33***	14.08***
	(1.387)	(0.931)
Observations	719	1,498
R-squared	0.207	0.180

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Aggregated Data from all Waves

	(1)	(2)
VARIABLES	SDQ Total Difficulties Score	SDQ Total Difficulties Score
Warmth0	0.329	0.270
	(0.618)	(0.614)
Warmth2	-0.869***	-0.791**
	(0.308)	(0.311)
Harshness0	-0.837***	-0.876***
	(0.168)	(0.168)
Harshness2	0.881***	0.967***
	(0.267)	(0.267)
Routine0	2.166***	2.127***
	(0.530)	(0.526)
Routine2	-1.344***	-1.357***
	(0.274)	(0.272)
Educational Time Investment	-1.369***	-2.254***
	(0.330)	(0.381)
Non-educational Time Investment	-1.109***	-1.025***
	(0.250)	(0.250)
General Health of Mother	-1.008***	-0.991***
	(0.288)	(0.286)
Mother's Mental Health	0.239***	0.234***
	(0.0306)	(0.0306)
Mother has Higher Education?	-0.835***	-0.837***
	(0.154)	(0.153)
Is the mother earning?	-1.193***	-1.205***
	(0.176)	(0.176)
Child long-term health condition	2.515***	2.526***
	(0.252)	(0.252)
Child has any sibling?	-0.718***	-0.597***
	(0.226)	(0.227)
Female Child	-1.021***	-1.014***
	(0.153)	(0.152)
Subjective Financial Situation	0.368**	0.375**
	(0.162)	(0.162)
Wave Binary Variables	No	Yes
Constant	14.11***	14.35***
	(0.569)	(0.594)
Observations	4,312	4,312
R-squared	0.173	0.180

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Odd and Even Numbered Waves

	Odd-Numbered Waves	Odd-Numbered Waves	Even-Numbered Waves	Even-Numbered Waves
VARIABLES	SDQ Total Difficulties Score	SDQ Total Difficulties Score	SDQ Total Difficulties Score	SDQ Total Difficulties Score
Warmth0	0.667	0.554	-0.392	-0.362
	(0.778)	(0.776)	(0.986)	(0.988)
Warmth2	-0.521	-0.447	-1.300**	-1.292**
	(0.389)	(0.392)	(0.505)	(0.507)
Harshness0	-0.751***	-0.818***	-0.956***	-0.963***
	(0.219)	(0.220)	(0.260)	(0.259)
Harshness2	1.115***	1.205***	0.564	0.591
	(0.359)	(0.358)	(0.401)	(0.403)
Routine0	2.117***	2.096***	2.173**	2.188***
	(0.680)	(0.673)	(0.844)	(0.845)
Routine2	-1.606***	-1.598***	-1.027**	-1.029**
	(0.358)	(0.358)	(0.420)	(0.420)
Educational Time Investment	-2.035***	-2.755***	-1.860***	-1.938***
	(0.523)	(0.590)	(0.491)	(0.510)
Non-educational Time Investment	-0.850***	-0.757**	-1.422***	-1.401***
	(0.328)	(0.327)	(0.382)	(0.384)
General Health of Mother	-0.898**	-0.881**	-1.118**	-1.116**
	(0.363)	(0.360)	(0.479)	(0.479)
Mother's Mental Health	0.246***	0.241***	0.225***	0.225***
	(0.0400)	(0.0402)	(0.0477)	(0.0476)
Mother has Higher Education?	-1.043***	-1.068***	-0.508**	-0.515**
	(0.204)	(0.202)	(0.234)	(0.234)
Is the mother earning?	-1.079***	-1.127***	-1.276***	-1.279***
	(0.232)	(0.232)	(0.272)	(0.273)
Child long-term health condition	2.461***	2.474***	2.614***	2.613***
	(0.344)	(0.343)	(0.370)	(0.370)
Child has any sibling?	-0.803***	-0.796***	-0.270	-0.246
	(0.287)	(0.286)	(0.377)	(0.380)
Female Child	-0.859***	-0.853***	-1.221***	-1.217***
	(0.202)	(0.202)	(0.232)	(0.232)
Subjective Financial Situation	0.318	0.354	0.420*	0.414*
	(0.215)	(0.215)	(0.245)	(0.246)
Wave Binary Variables	No	Yes	No	Yes
Constant	14.44***	14.38***	14.15***	14.15***
	(0.759)	(0.776)	(0.888)	(0.906)
Observations	2,560	2,560	1,752	1,752
R-squared	0.175	0.180	0.180	0.180

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Income Groups

	Income Group 1	Income Group 2
VARIABLES	SDQ Total Difficulties Score	SDQ Total Difficulties Score
Warmth0	0.210	0.553
	(0.689)	(0.868)
Warmth2	-0.924**	-0.535
	(0.399)	(0.456)
Harshness0	-0.890***	-0.800***
	(0.241)	(0.231)
Harshness2	0.987***	0.873**
	(0.342)	(0.380)
Routine0	1.776***	2.651***
	(0.569)	(0.762)
Routine2	-1.153***	-1.702***
	(0.340)	(0.375)
Educational Time Investment	-2.086***	-2.920***
	(0.491)	(0.556)
Non-educational Time Investment	-1.681***	-0.392
	(0.371)	(0.327)
General Health of Mother	-0.778**	-1.211***
	(0.336)	(0.417)
Mother's Mental Health	0.265***	0.199***
	(0.0367)	(0.0376)
Mother has Higher Education?	-0.918***	-0.529**
	(0.243)	(0.212)
Is the mother earning?	-1.012***	-0.878***
	(0.227)	(0.311)
Child long-term health condition	2.593***	2.380***
	(0.290)	(0.292)
Child has any sibling?	-0.832**	-0.393
	(0.370)	(0.280)
Female Child	-0.947***	-1.081***
	(0.219)	(0.210)
Subjective Financial Situation	0.0432	0.479**
	(0.226)	(0.241)
Wave Binary Variables	Yes	Yes
Constant	15.04***	13.57***
	(0.781)	(0.895)
Observations	2,351	1,943
R-squared	0.172	0.162

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6 Discussion

Overall, our findings indicate a positive relationship between maternal harshness and child socio-emotional problems and a negative relationship between maternal warmth and child socio-emotional problems. These findings are consistent with several studies, especially the ones which were carried out in the field of child psychology. For example, in a study consisting of young school-going adolescents in Spain, it was discovered that higher maternal warmth was linked to lesser internalizing problems such as depression, anxiety, and hyperactivity, as well as lesser externalizing problems such as aggression, bullying, and disobeying rules (Alegre et al., 2014). Additionally, in a study containing participants from eight countries, including Italy, China, Thailand, etc., the results reflected a negative relationship between maternal warmth and children's aggression and anxiety and a positive relationship between corporal punishment and children's aggression and anxiety (Lansford et al., 2014).

Moreover, according to our results, maternal warmth in the past seems to be negatively related to child socio-emotional issues in the present. On the other hand, an increase from medium to high level of maternal harshness in the present is positively associated with child socio-emotional issues in the present, while a similar change in maternal harshness in the past is not associated with child socio-emotional skills in the present. These findings seem to be in line with a study, in which the authors concluded that maternal warmth is associated with a decrease in children's aggression and anxiety over time. Moreover, maternal warmth mitigates the negative effects of maternal harshness on children's aggression and anxiety (Lansford et al., 2014). Also, in a study composed of Mexican American adolescents, maternal warmth was found to moderate the impact of harsh disciplining practices on children's externalizing problems (Germán et al., 2013).

There are several ways our model can be improved. Parental warmth and harshness are not the only factors governing parenting styles. Instead, parenting style is captured by other factors such as the varieties of methods parents utilize in order to discipline their children other than shouting or corporal punishment, such as time-outs, taking away privileges, and rewarding good behavior. Other components of parenting style include the frequency of parents explaining the reasons behind rules to children, the frequency of parents

taking their children's views into account for setting certain rules, how frequently parents ignore their children's bad behavior and how often they spoil their children. Most of these factors are covered by the questions in the survey, and the dataset also contains indexes of Authoritarian, Authoritative, and Permissive parenting style for children aged 10-16, but not for the ones aged 5. Future and ongoing studies on parenting styles should collect information on these factors for younger children aged between 3 and 5 because younger children are more malleable to the negative effects of authoritarian and permissive parenting styles. As they grow up and start going to school, they are exposed to external influences, which need to be considered in order to evaluate the relationship between parenting style and children's socio-emotional outcomes. For older children, we might need to run an instrumental variable estimation to account for reverse causality, simultaneity, and omitted variable bias.

Early childhood variables like birth weight and whether the child was exclusively breastfed can be a useful addition to our model as covariates because these variables give us an idea about the overall physical health of the child, which further influences both cognitive and non-cognitive outcomes in the future. These variables are included in the BHPS datasets, while we only worked with Understanding Society datasets.

In addition, our model assumes the mother as the primary caretaker of children, while in some cases, grandparents, fathers, or nannies fulfill the role of caretakers. Further insights can be drawn by relaxing this assumption and controlling for whether the mother or someone else is the primary caretaker of the child. Furthermore, it can be useful to account for the marital status of the parents and how involved both parents are in their children's lives. Including as many relevant covariates as possible can lessen the likelihood of facing omitted variable bias, but it can also lessen the degrees of freedom, especially when we have observations below 1000 for children aged 5 in Wave 3.

In this thesis, we consider only maternal parenting style variables. It is possible that the fathers may have a different parenting style from mothers. It might be useful to consider various combinations of parenting styles of mothers and fathers in two-parent families as parental inputs for child outcomes. For example, both parents might be authoritative or the mother is authoritative while the father is authoritarian. We can then check which combinations of parenting styles are associated with the most desirable outcomes of children.

The parental input variables and the child outcome variables in our model are reported by parents. Data from surveys can be affected by the Observation Bias or the Hawthorne Effect, which occurs when the participants of a study may not respond completely accurately, due to the fear of being judged negatively by the interviewers. According to Smetana (1995), parents consider themselves as more authoritative, while the children consider the same parents as more authoritarian or permissive. Instead of self-reports, parents and children can be provided with tasks to complete in an experimental setting. The tasks can be designed in a way, which provide an adequate idea about the parenting style of parents. Children can also be asked questions related to the parenting practices of their parents, such as how strictly the rules are enforced, what kind of punishments they face due to disobedience, and so on. The responses provided by both parents and children can be compared to check for discrepancies. Additionally, the information on the children's socio-emotional outcomes can be obtained from informants other than the parents, such as teachers, friends and relatives. That way, we can take into account the child's behaviors in different contexts such as home, school, parks, and so on.

In several western countries, corporal punishment is looked down upon and also illegal. However, corporal punishment is more common in the eastern countries than in western countries, especially because the beliefs and value systems of the eastern countries are vastly different from those in the western countries. In many eastern cultures, particularly Asian cultures, parents are considered an absolute authority who must be obeyed at all costs, so parents consider the use of corporal punishment and other authoritarian parenting measures their right. In particular, the parenting styles of older Chinese generations were influenced by Confucianism and characterized by expressing low levels of emotions and exerting a high amount of control, which are the typical features of an authoritarian parenting style (Qui & Shum, 2022). In addition, some cultures promote helicopter parenting, in which parents pay excessive attention to children's activities in order to prevent them from getting harmed, and to help them succeed in their studies and professional lives. Other cultures encourage parents to provide freedom to their children and let them perform their activities and make their decisions independently. These cultural factors should also be considered while analyzing the relationship between parenting style and child development. More

studies ought to be carried out in such countries in order to gain a more comprehensive understanding of the link between parenting style and child skills.

The outcome variable of the model discussed in this thesis is the SDQ Total Difficulties score, which does not include the prosocial behavior of the children. Evaluating the relationship between parenting style and prosocial behavior might reveal specific findings, which can help explain the difficulties children face in making friends and building healthy relationships with people around them, such as siblings, school fellows, and other children in the neighborhood. The British Understanding Society data and other household longitudinal studies, which report data on parent-child relationships, contain data that can help us in constructing measures of internalizing and externalizing behavior of children. Thus, the association of parenting style can be examined separately with internalizing and externalizing behavior of the child.

7 Conclusion

Parenting style can be divided into the following categories: Authoritarian, Authoritative and Permissive. The Authoritarian parenting style is characterized by high control, less warmth, and the use of harsh disciplining practices such as yelling and corporal punishment. The Authoritative parenting style is characterized by less control, more warmth, and less harsh disciplining practices. Permissive parenting is characterized by virtually no control, complete freedom to make choices, and more warmth. In this thesis, our aim was to evaluate the relationship between parenting style and socio-emotional skills of children aged 5.

We utilized the British Understanding Society dataset for this purpose. In our model, the socio-emotional skills of the child are captured by the SDQ Total Difficulties score of the child. For parenting style, we consider measures of maternal warmth and harshness. Our measure of maternal warmth is constructed by variables measuring the frequency of mothers hugging or cuddling their children and the frequency of mothers praising their children. Our measure of maternal harshness is constructed by variables measuring the frequency of mothers slapping or spanking their children and the frequency of mothers yelling or shouting at their children. In addition, we include variables capturing the meal time and sleeping routines of children along with parental educational and non-educational time investment. We also included some covariates in our model, such as the child's long-standing health condition, gender of the child, whether the child has any siblings, mother's education, mother's general health, mother's mental health, and subjective financial situation of the family. First, we conducted the analysis for Wave 3. Then, we aggregated Waves 3 to 11 and ran the analysis for all children aged 5 in the aggregated sample. Next, we ran our model for odd-numbered and even-numbered waves separately in order to evaluate the effects of parenting style variables in the past, on child's socio-emotional skills in the present. Lastly, we carried out the analysis for lower and higher income groups in our sample separately.

All in all, we discovered a negative relationship between maternal warmth and SDQ Total Difficulties score and a positive relationship between maternal harshness and SDQ Total Difficulties score. Regular meal time and sleep time routine of children has a negative relationship with SDQ Total Difficulties score. Both parental educational and non-

educational time investment is negatively associated with SDQ Total Difficulties score. Also, mother's education and her good general health is negatively related to SDQ Total Difficulties score. Mother's poor mental health is linked to a higher SDQ Total Difficulties score and the children whose mothers earn an income have a lower SDQ Total Difficulties score than the children whose mothers who do not. Children who have a long-standing health condition have a higher SDQ Total Difficulties score than those who do not. Female children, on average, have a lower SDQ Total Difficulties score than male children. Moreover, maternal warmth in the past is negatively associated with the child's SDQ Total Difficulties score in the present Furthermore, for children belonging to households in the lower income group, a high level of warmth is negatively linked to SDQ Total Difficulties score of the child. However, for children belonging to households in the higher income group, there is no significant relationship between high level of warmth and SDQ Total Difficulties score of the child. Maternal harshness is positively related to child SDQ Difficulties scores for both income groups but the association is stronger for the lower income group.

These findings justify the need for interventions, which provide awareness to parents on the consequences of harsh parenting practices and help them to improve their parenting styles, in order to provide a healthy home environment to their children. They also pose the need for policy measures which make harmful parenting practices such as corporal punishment, illegal at the state level, and introduce consequences such as fines or imprisonment for corporal punishment. In addition, interventions which assist children, who have been subjected to harsh parenting practices, to improve their socio-emotional skills, are in line with these findings.

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