EFFECTS OF INTENTION STATUS AND SOCIAL SUPPORT ON PARENTAL INVESTMENT

by

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ABSTRACT

According to life history theory, human mothers rely on assistance from others for childrearing help. Studies have shown that mothers who have insufficient support often report having unwanted or mistimed pregnancies. In turn, unwanted pregnancies may lead to reduced parental investment. This study is the first to analyze the interaction between pregnancy intention status and social support to better understand parental investment. Using data from the Millennium Cohort Study of the U.K. which includes over 18,000 respondents, this study examines how planned pregnancy and social support variables – measured as assistance from a partner, family, or friends – is associated with parental investment. Parental investment is measured using 12 different variables that encompass emotional resources and behavioral/physical investment, including prenatal care, birthweight, breastfeeding duration, vaccinations, tobacco cessation, childcare and school costs, how much time a mother spent with her child (or how often she read to her child), how emotionally close she felt to her child, and how frequently she had conversations with her child about things important to him/her. Results indicate that social support does not universally interact with intention status to predict investment, but both intention status and social support are correlated with at least some parental investment indicators. Results suggest that mothers need better access to social support or aid from abusive relationships to improve child well-being.

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CHAPTER ONE: INTRODUCTION

Based on the National Survey of Sexual Attitudes and Lifestyles from the UK, 1 in 6 pregnancies was unplanned, and over a quarter of mothers reported feeling ambivalent about their pregnancies in 2009 (Wellings et al. 2013). Along with this, the majority of unplanned pregnancies were from mothers who were not in a relationship or cohabitating (Wellings et al. 2013). While several studies have looked at intention status (whether a pregnancy was planned or not) and parental investment, or social support and allomaternal care (care given to a child by an individual that is not the child's mother), no research has investigated the effects of intention status combined with social support of mothers to predict investment in children. Based on our evolutionary history, particularly with our reliance on allomaternal care as cooperative breeders who need help to care for our children and our affinity for pair-bonding (Chapais 2008), this study explores how social support interacts with intention status of offspring to affect parental investment in offspring.

Evolutionary History & Life History Theory

Is poorly timed pregnancy a novelty? Evidence shows that women have been timing their pregnancies for hundreds of years, and other methods besides hormonal birth control or condoms as contraception have been successful. A popular option of natural contraception among hunter-gatherer populations is birth spacing, extensive breastfeeding, and abstinence during parts of ovulation cycles, even if women aren't sure what causes the cycle (Bengtsson and Dribe 2006; Cinnirella and Klemp 2017; Gribaldo,

Judd, and Kertzer 2009). In other areas like Costa Rica and Indonesia, historically women have been reported using concoctions and natural medicines to prevent pregnancy or cause an abortion, and some of these "traditional" methods continue today (Boomgaard 2003; Sainz De La Maza Kaufmann 1997). The evidence of historical and cross-cultural use of contraception suggests that unwanted and mistimed pregnancies are part of our evolutionary history. Untimely births do not only occur in humans--in fact, studies have shown that marmosets, who are also cooperative breeders, may commit infanticide if they do not have sufficient allocare, or refuse to care for an infant if an untimely birth occurs (Fite et al. 2005; Hrdy 2016). Not only do humans seem to have mistimed pregnancies in our evolutionary history, but other non-human cooperatively breeding primates also appear to experience mistimed pregnancies and exhibit violence or lack of involvement with the offspring for which they do not have sufficient resources to provide.

Typically, resources are thought of in terms of bioenergetics and calories; however, social support is another resource that is necessary for childrearing. According to life history theory, human mothers rely on assistance from other individuals to aid with childcare as a method of reducing investment, reducing birth intervals and increasing reproductive success (Kramer 2010). Allocare is typically provided by partners, grandparents, siblings and other relatives (Hames and Draper 2004; Hawkes and Smith 2009; Hrdy 2009; Kramer and Veile 2018; Sear and Mace 2008) in an effort to reduce caloric and resource depletion from a mother. These methods of reducing parental investment include using wet-nurses, foster care, and other forms of allocare, and in extreme cases, mothers may even abandon or kill their infants as a last resort (Hrdy 1992). One study spanning from 1982 through 2010 demonstrated that women were more

likely to have intended births if they were married or cohabitating, particularly if they were older and had more education (Mosher, Jones & Abma 2012), which raises questions about whether intention status is associated with parents' investment and how social support is related to parental investment. Some have hypothesized that postpartum depression and other perinatal mood disorders may signal a need for additional social support by mothers (Hagen 1999; Rackin and Brasher 2016). These studies demonstrate that social support is a key feature of human reproduction and without it mothers and children may suffer negative consequences.

From evolutionary theory we posit that parental investment is driven by both a) Hamilton's rule – that parents invest in offspring when the benefit reduced by the coefficient of relatedness outweighs the cost (Hamilton 1964) – and b) reproductive value – that those with greater expected future reproduction (due to age, sex, or other individual characteristics) will be preferentially helped (Salmon and Malcolm 2015). However, research on Parent-Offspring Conflict indicates other factors may need to be considered in the relationship (Salmon and Malcolm 2015). For instance, a woman who is still investing in herself (perhaps still growing or investing in education) may prefer to reduce investment in her current offspring so she can preferentially invest in herself. This has been conceptualized as a tradeoff between current and future reproduction (Kramer 2010). A woman in such a situation may find a pregnancy to be mistimed. Similarly, the amount of social support a woman receives may also influence how much investment she provides her offspring, although the predicted direction of the effect is unclear (Gowaty et al. 2007; Hrdy 2016; Hrdy 1992). Women who have less social support may need to invest more in their offspring since there is no one else to provide that investment *or*

women who have less social support may reduce their investment in the current offspring because the likelihood of offspring success without alloparents is low (Hrdy 1992), and mothers may prefer to invest in future offspring if social support improves.

Intention Status & Social Support

Prior research has suggested that children conceived unintentionally may have less investment from their parents (Barber and East 2009; Dott et al. 2009; Hall et al. 2017; Kost, Landry, and Darroch 2017; Lepper et al. 2015). Most studies examining the role of pregnancy intention status on parental investment reflect maternal behaviors prior to birth or shortly after birth (e.g., prenatal care, tobacco cessation, dietary changes, etc.). One study shows that mothers intending their pregnancy within the next 12 months were 20-30% less likely to binge drink during pregnancy than mothers who were not planning their pregnancy (Lepper et al. 2015), another shows babies resulting from unplanned pregnancies tend to have reduced birthweight (Hall et al. 2017), and analyses run on the National Maternal and Infant Health Survey indicate that mothers who have planned pregnancies are more likely to quit smoking during pregnancy and access appropriate prenatal care compared to mothers with unplanned or mistimed pregnancies (Kost et al. 2017). Other studies correlate children resulting from unintended pregnancies with poor living environments, including higher levels of abuse (Bartlett et. al. 2017), and higher exposure to secondhand smoke (Ren, Chen and Stanton 2012). Barber and East (2009) found that children resulting from unintended or mistimed pregnancies had reduced access to "emotional and educational resources," which they defined as "personal and material opportunities for skill development that are intended to enhance children's cognitive development," (including books in the home, the frequency of a parent reading

to the child, frequency of parents teaching the child new skills and the availability of age-appropriate learning materials) and "the warmth and responsivity of the mother, the mother's parenting style, the time the family spends together, the time the father spends with the child, and the extent that parents promote the child's independence" (Barber and East 2009).

While the literature above indicates unintended offspring receive fewer resources and individuals without sufficient social support to care for a child may not want offspring, there have not been any studies to explore the effect of both pregnancy intention status and social support in regard to parental investment in the child's life. This study focuses on how planned pregnancy and amount of perceived social support affects the amount of parental investment a mother provides for her offspring. I hypothesize that mothers who have planned pregnancies will invest more in their children than mothers who have unplanned pregnancies, and mothers who have ample social support will provide more parental investment than mothers with poor social support available. If social support is acting as a moderator and I expect reduced social support to lead to reduced parental investment, I expect mothers with planned children and low social support to have reduced parental investment, and mothers with unplanned children but high social support to have increased parental investment. Planned pregnancy is defined as whether the mother reported her pregnancy as planned or a surprise and social support is measured by several variables after birth indicating support from family, friends, and her partner. Based on previous literature, parental involvement is measured by parental behaviors including accessing prenatal care, breastfeeding duration, the child's vaccinations, tobacco cessation during pregnancy (for mothers who were smokers before

pregnancy), and private school fees, as well as measures of emotional investment, like time spent with her child, how close a mother feels to her child, and how often a mother talks to her child about things important to him/her. Examining these diverse measures of investment will allow an exploration of the many ways mothers invest in their children without excluding low income mothers with less ability to invest financially. Similarly, exploring multiple forms of social support between family, partners, friends/neighbors, and paid help allows a more comprehensive investigation of relationships between social support and parental investment.

This Study

For this study, factors considered to measure parental investment include: prenatal care, birthweight, breastfeeding duration, vaccinations, tobacco cessation, childcare and school costs, time a mother spent with her child (or how often she read to her child), mothers' emotional closeness to child, and frequency of conversations between mother and child. These investment variables can be categorized into prenatal investment and postnatal investment. The prenatal variables include: prenatal care, birthweight, and tobacco cessation. Care for a child in the womb can ensure a child is born at a healthy weight and may help prevent future health issues like insulin deficiency and coronary heart disease (Barker 1995). Factors considered to measure postnatal maternal investment include: breastfeeding, vaccinating the child, money spent on childcare/education, and an investment of time. Breastfeeding duration and the number of vaccinations a child receives is a method of investment that ensures children remain healthy as they age (Kramer and Veile 2018). The expectation is that parents spend more money on schooling and childcare to invest in their children and give them the best education

(Hedges et al. 2016). Lastly, the expectation is that parents to invest more time with their children if possible; research has shown children raised by other forms of care are at a disadvantage and have a higher risk of mortality compared to children raised by their parents (Hrdy 1992). By including a variety of variables to measure maternal investment, this allows variations in prevalence of investment types. The innovation of this study is the inclusion of investment variables that are not economically driven and could be used cross culturally for future analyses.

Prediction

This study aims to explore how planned pregnancy and amount of perceived social support affects the amount of parental investment a mother provides for her offspring. I hypothesize that mothers who have planned pregnancies will invest more in their children than mothers who have unplanned pregnancies, and mothers who have ample social support will provide more parental investment than mothers with poor social support available. Further, I expect mothers with planned children and low social support to have reduced parental investment compared to mothers with high social support, and mothers with unplanned children, but high social support to have increased parental investment compared to mothers with low social support (see figure 1a and 1b for expected interaction plot). Planned pregnancy is measured as whether the mother reported her pregnancy as planned or a surprise, and social support is measured by maternal report of support from family, friends, and her partner. Based on previous literature, parental investment includes measures of parental behavior and emotional investment such as accessing prenatal care, breastfeeding duration, child vaccinations, tobacco cessation, school/childcare fees, time spent with child, how close a mother feels

to her offspring, and how often a mother talks to her child about things important to him/her. By examining these diverse measures of investment, we can examine the myriad ways mothers invest in their children without excluding low income mothers that have skewed results in previous studies. I am investigating multiple different forms of social support between family, partners, friends/neighbors, and paid help to see if different types of social support have differential associations with parental investment.

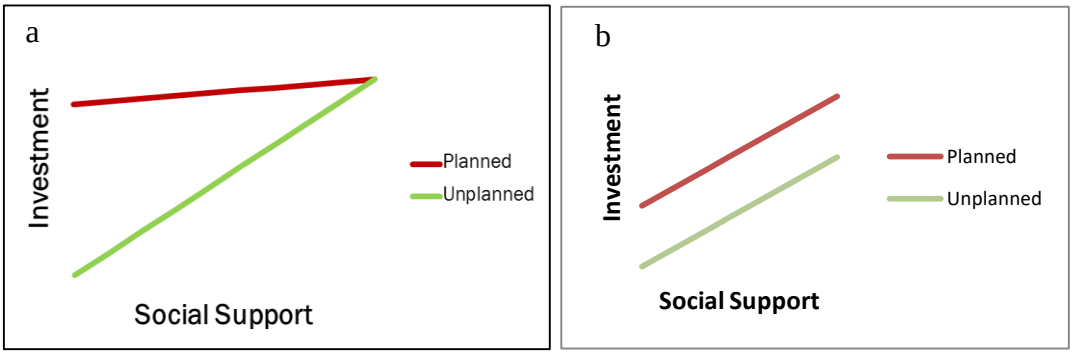

Figure 1. a. Expected interaction plot between intention status and social support, in which high social support increases parental investment depending on intention status. B. Main effects plot between intention status and social support, in which high social support increases parental investment regardless of intention status.

CHAPTER TWO: METHODS

This analysis was performed using the Millennium Cohort Study, a longitudinal study examining child development in the U.K. from the year 2000 forward. Questionnaire topics include family composition, housing, education, income and employment, health, parenting activities, and childcare. Data was collected from 398 electoral wards in England, Scotland, Wales, and Northern Ireland, with a goal of over-representing areas of high child poverty, ethnic minorities in England, and the three smaller countries of the UK. Interviews were completed both face-to-face as well as a self-completed questionnaire by the parents of the cohort member. For the purpose of this study, I only include mother-child dyads that include natural born mothers of the cohort members. Some families had multiple children in the study, but due to the fact that the additional children in the family were sets of twins or triplets, this analysis only includes answers regarding the first child excluding any twin or triplet (which excluded less than 2% of children). The first wave of data collected (referred to as sweep one) was collected between June 2001 and January 2003 when cohort members were around 9 months of age. A total of 18,552 families were surveyed. Sweeps 2 through 6 were collected every 2-3 years, when children were ages 3, 5, 7, 11, and 14, and the number of respondents dropped with each interview until only 11,726 families remained in sweep 6.

Variables

Independent Variables

The variable, intention status, was collected in sweep 1 and used across all models in all 6 sweeps. It was measured as the response to the question, "were you planning to get pregnant at that time or was it a surprise?", with possible responses: 'Planning to get pregnant' or 'Pregnancy was a surprise'.

Social support was measured in a variety of ways. In sweeps one through five, social support is partially measured by the main form of childcare, which was categorized in different ways depending on the wave. In wave one, it was categorized as: self/partner, relatives, friends/neighbors, or paid help; in sweeps three through five, it was categorized as: relatives, friends/neighbors, paid help, or "other" with "self/partner" assumed to be included in the "other" category for these sweeps. In sweeps three and five, main childcare was divided into care over the weekend and childcare during the school week. In sweep four, only main childcare during the week was included. Care from the mother's partner, family, or friends/neighbors is used as a proxy for high social support. Next, the frequency in which the mother spends time with friends is present in sweeps one and three, which was coded as having no friends, never spending time with friends, spending time 1-2 times per week, spending time 3-4 times per week, or spending time every day or almost every day. Spending more time with friends is used as a proxy of greater social support (although this could go the opposite direction if spending time with friends takes time away from a mother's child). Another form of social support included in sweeps one and two was measured by whether the mother felt her family would help in times of financial need at time of interview which was measured on a Likert scale from strongly

disagree (1) to strongly agree (5) and was analyzed as a continuous variable. In all six sweeps, the measure of social support from a partner was indicated by how happy the respondent is in her current relationship, which was also measured on a Likert scale from very unhappy (1) to very happy (7) and was analyzed as a continuous variable. Mothers who were not in a relationship were coded as "not applicable" and were left out of analysis. Here, a happier relationship should be a proxy for greater social support from the mother's partner. In sweeps three and five, additional social support from family members is measured with the frequency the cohort member sees their grandparents, which was coded on a scale from not at all (0) to every day or almost every day (6). Sweep three also includes the frequency the cohort member sees other relatives, which is coded in the same manner as the variable for frequency they saw their grandparents. For this variable, visiting grandparents or other relatives should act as a proxy for increased social support from those family members. In sweeps four and five I also include whether friends or family live in the same area as the respondent, which was coded as friends, family, both, or none. Living close to family or friends is a proxy for higher social support due to their proximity.

Dependent Variables

The dependent variables all represent maternal investment and include a) whether the child received prenatal care, b) birthweight in ounces, c) breastfeeding duration, d) immunizations received (measured as: number of immunizations, any immunizations, and all immunizations), e) amount paid for childcare or school fees, f) if the mother smoked, whether she gave up smoking during pregnancy, g) how often a mother read to her child, h) amount of time a mother spent with her child, i) how emotionally close a

mother felt to her child, and j) how often a mother spoke to her child about things that were important to him/her. See Table 1 for details on how these variables are measured and in which sweeps data was collected.

Receiving prenatal care, having a heavier birthweight, longer breastfeeding duration, more immunizations, higher cost of childcare per week and giving up smoking are all proxies for greater parental investment. Reading more to a child, spending more time with a child, and feeling more emotionally close to a child are also proxies for greater parental investment. See Table 1 for details on which independent and dependent variables are included for each wave.

Analysis

For the purpose of this study, the relationship between intention status, social support, and investment were evaluated using logistic regression (for binary dependent variables) and multiple linear regression (for continuous dependent variables). All statistical analyses were performed using SPSS. All sweeps included control variables for age of mother, country of residence (England, Wales, Scotland or Northern Ireland), ethnicity, highest schooling, religion, income of the family, and the amount of time spent at work. Each sweep was run with the interaction of each social support variable with intention status, as I predict that the role of intention status may be moderated by social support. Another model was run with just main effects of all independent variables together in one model per sweep to examine the individual contributions of each type of social support.

Table 1 Dependent Variables

Dependent Variable	Wave collected	Type of variable	Measurement details for categorical variables
Prenatal care	1	Binary	1=received prenatal care, 0=no prenatal care
Birthweight (ounces)	1	Continuous	0-255 ounces
Breastfeeding duration	1, 3	Continuous	Sweep 1: days, 0-365 Sweep 3: months, 0-72
Number of immunizations	3	Continuous	1-22 vaccinations
Any immunizations	1	Binary	1=received any immunization, 0=received no immunizations
All immunizations	1,2,3	Binary	1=received all immunizations, 0=failed to receive at least 1 immunization
Childcare / school fees	1,4,5,6	Sweep 1, 4, 5: Continuous; Sweep 6: Binary	Sweep 1: per week, £0- 1850 Sweep 4: per term £0-5000 Sweep 5: per term £0-10000 Sweep 6: per term 1=Greater than £5000, 0=Less than £5000
Whether mother quit smoking during pregnancy	1	Binary	1=Mother quit smoking, 0=Mother did not quit smoking
Frequency of reading to child	2	Binary	1 = read everyday; 0 reads less frequently
Emotional closeness with child	2,4,6	Sweep 2 & 6: Binary; Sweep 4: Continuous	Sweep 2 & 6: 1 = very close; 0 = less than very close Sweep 4: 0-14
Amount of time spent with child	3,4,5	Continuos	Sweep 3 & 4 : 0-35 Sweep 5: 0-15
Frequency of speaking to child about thing important to him/her	6	Binary	1=everyday, 0=less often

Table 2 Variables for each sweep

IV	prenatal care	birthweight	breastfeed duration	any vaccinations	all vaccinations	childcare/ school costs	changed smoking habit	how often read	how close to child	time spent w/ child	talks to child about imp. things
main care	1	1	1	1	1, 2, 3	1, 4, 5	1	2	2, 4	3, 4, 5	
freq w/ friends	1	1	1	1	1, 3	1	1			3	
fam would help	1	1	1	1	1, 2	1	1	2	2		
happy relationship	1	1	1	1	1, 2, 3	1, 4, 5, 6	1	2	2, 4, 6	3, 4, 5	6
freq. cm sees gps					3	5				3, 5	
freq cm sees relatives					3					3	
friends/fam in area						4, 5			4	4, 5	
Planned pregnancy	1	1	1	1	1, 2, 3	1, 4, 5, 6	1	2	2, 4, 6	3, 4, 5	6

Table 2. List of independent and dependent variables. Each box indicates which sweeps the variables are used. cm stands for cohort member (the child in the survey)

CHAPTER THREE: RESULTS

Of the 18,515 mothers that responded in Sweep 1, 62.1% of them were from England, 14.9% were from Wales, 12.6% were from Scotland, and 10.4% were from Northern Ireland. The majority of mothers reported being white at 82.4%, with 3.5% reporting as black, 9.8% reporting as Asian, and 4% reporting as mixed/other. 43% of mothers did not belong to a religion, 44.5% were Christian, or 12.6% of mothers were part of a non-Christian religion. Ages of mothers ranged from 14 to 53 with the mean age being 29 years of age. The mean income for mothers in sweep 1 was around 27,000 pounds, and most mothers had at least some education, with only 19.5% reporting not having a higher degree or above.

Of the 18,515 mothers in the original survey, 53.9% reported their pregnancies as planned. Happiness in relationship was measured on a Likert scale from (1) very unhappy to (7) very happy, and mothers generally reported being relatively happy in their relationships with a mean value around 5 across all sweeps. 30-40% of mothers reported relying on relatives to take care of their children, and approximately 40% of mothers spend time with their friends 1-2 times per week. See Table 3 below for additional descriptive statistics for each independent variable across all sweeps.

Since there were 12 dependent variables across a variety of waves, I examined 24 different models. The results of prenatal care (sweep 1), how often a child was read to (sweep 2), number of vaccinations (sweep 3), and school fees (6) did not yield any statistically significant ($p > 0.05$) results. The results of these models can be found in the

Appendix. Vaccinations (sweep 2) and school fees (sweeps 4 & 5) had fewer than 300 respondents (< 2% of original respondents), potentially due to the fact that they had answered the same question in previous sweeps, and therefore will not be included in discussion of analyses. Results below are from models run with all variables included and statistically significant interactions mentioned separately.

Table 3 Result Ratios and Means

		Sweep 1		Sweep 2		Sweep 3		Sweep 4		Sweep 5		Sweep 6	
		N / *Mean	% / *Std Dev	N / *Mean	% / *Std Dev	N / *Mean	% / *Std Dev	N / *Mean	% / *Std Dev	N / *Mean	% / *Std Dev	N / *Mean	% / *Std Dev
Planned Pregnancy													
	Surprise	8491	45.90%	6416	42%	6287	44.10%	5580	43.20%	5234	43.30%	4350	41.80%
	Planned	9974	53.90%	8196	53.60%	7956	55.90%	7340	56.80%	6865	56.70%	6062	58.20%
Main Childcare Weekday													
	Self/Partner	2146	27.60%	512	12.30%	--	--	--	--	--	--	--	--
	Relatives	3185	40.90%	1416	34.10%	4600	31.20%	4603	34.50%	4309	34.30%	--	--
	Friend/Neighbor	169	2.20%	399	9.60%	452	3.10%	401	3%	571	4.50%	--	--
	Paid help	2282	29.30%	1820	43.90%	932	6.30%	935	7%	543	4.30%	--	--
	Other	--	--	--	--	8746	59.40%	7390	55.40%	7137	56.80%	--	--
Main Childcare Weekend													
	Self/Partner	--	--	--	--	--	--	--	--	--	--	--	--
	Relatives	--	--	--	--	4391	29.80%	--	--	3666	29.20%	--	--
	Friend/Neighbor	--	--	--	--	170	1.20%	--	--	200	1.60%	--	--
	Paid help	--	--	--	--	78	0.50%	--	--	77	0.60%	--	--
	Other	--	--	--	--	10091	68.50%	--	--	8616	68.60%	--	--
Freq. w/ Friends													
	No Friends	5546	30%	--	--	153	1%	--	--	--	--	--	--
	Not at all			--	--	3111	21.10%	--	--	--	--	--	--
	1-2 times	7938	42.90%	--	--	6911	47%	--	--	--	--	--	--
	3-6 times	3178	17.20%	--	--	2886	19.60%	--	--	--	--	--	--
	Everyday	1828	9.90%	--	--	1650	11.20%	--	--	--	--	--	--
Fam would help													
	Family would help if financial problems (1-5)	*4.25	*.971	*4.17	*1.172	--	--	--	--	--	--	--	--
Frequency sees grandparents													
	Not at all	--	--	--	--	353	2.40%	--	--	1148	8.90%	--	--
	Less often	--	--	--	--	1537	10.60%	--	--	1822	14.10%	--	--
	Once or twice a month	--	--	--	--	1924	13.20%	--	--	1916	14.90%	--	--
	Once or twice a week	--	--	--	--	4156	28.60%	--	--	3622	28.10%	--	--
	Several times a week	--	--	--	--	3068	21.10%	--	--	2100	16.30%	--	--
	Every day or almost every day	--	--	--	--	3490	24%	--	--	2282	17.70%	--	--
Frequency sees other relatives													
	Not at all	--	--	--	--	322	2.20%	--	--	--	--	--	--
	Less often	--	--	--	--	2889	19.80%	--	--	--	--	--	--
	Once or twice a month	--	--	--	--	3634	24.90%	--	--	--	--	--	--
	Once or twice a week	--	--	--	--	3998	27.40%	--	--	--	--	--	--
	Several times a week	--	--	--	--	2125	14.50%	--	--	--	--	--	--
	Every day or almost every day	--	--	--	--	1638	11.20%	--	--	--	--	--	--
Friends/Family in the area													
	No	--	--	--	--	--	--	700	5.30%	1164	9.40%	--	--
	Yes, friends	--	--	--	--	--	--	2944	22.10%	3641	29.30%	--	--
	Yes, family	--	--	--	--	--	--	729	5.50%	807	6.50%	--	--
	Yes, both	--	--	--	--	--	--	8935	67.10%	6830	54.90%	--	--
Happy relationship													
	Happiness (1-7)	*5.60	*1.476	*5.59	*1.514	*5.57	*1.582	*5.55	*1.560	*5.69	*1.423	*5.51	*1.830

Table shows proportions for each category within each sweep for categorical variables, mean value for continuous variables, and percentage included or standard deviation. * represents means or standard deviations depending on the column.

Sweep One

When looking at whether the child had received all immunizations, there were no statistically significant interactions. For analysis of main effects, intention status was significant where unplanned children were significantly less likely to have had all necessary vaccinations than those that were planned (p = 0.011; see Table 4). Results for a child receiving *any* vaccinations are similar (p = 0.032) to the model of all vaccinations and are therefore not included in Table 4 (but are available in the Appendix). As expected, this demonstrates that children who are the result of an unplanned pregnancy receive less investment from their parents in terms of vaccinations.

Table 4 Sweep 1 – All immunizations

		SWEEP 1	
Variables		All vaccines	
Planned Pregnancy		Log Odds	S.E
	Surprise	-0.82	0.321
Main Childcare			
	Self/ Partner	reference	
	Relatives	0.581	0.364
	Friend/ Neighbor	-0.136	1.063
	Paid help	0.237	0.448
Freq. w/ Friends			
	Everyday	reference	
	No Friends/ Not at all	0.548	0.542
	1-2 times	0.818	0.545
	3-6 times	0.36	0.588
Fam would help			
	Family would help if financial problems	0.068	0.16
Happy/ Unhappy			
	Happy/ Unhappy with relationship	0	0.105

Table 4. Results from All Vaccines model for Sweep 1. Table shows log odds and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Of the mothers that responded, 38% smoked cigarettes leading up to their pregnancy. For mothers who used tobacco, there is a statistically significant interaction

between planned pregnancy and main form of childcare, in which there is a slightly higher smoking cessation rates for mothers whose pregnancies were surprises (compared to when the pregnancy was planned) and when a woman or her partner provides childcare after the birth of the baby (p=0.003; see Table 5). When analyzing main effects, the main form of childcare remains significant, but happiness in relationship also appears to be significant predictor of tobacco cessation during pregnancy. Mothers who reported greater happiness with her current partner had a higher likelihood of tobacco cessation by 1.15 odds (p = 0.02; see table 6). For the interaction, every category of childcare decreases likelihood of quitting smoking if a child is unplanned, unless the main form of childcare is the mother herself or her partner (see Figure 2). Also, mothers who reported having a happier relationship with their current partner are more likely to quit smoking during pregnancy based on our main effects model.

Table 5 Sweep 1 – Interaction effects on tobacco cessation

		Changed smoke habits	
Planned Pregnancy		Log Odds	S.E
	Surprise	-0.632	0.234
Main Childcare			
	Self/Partner	reference	
	Relatives	-0.979	0.211
	Friend/Neighbor	-0.465	0.206
	Paid help	-1.129	0.522
Interactions			
	Surprise * Paid Help	reference	
	Surprise * Self/Partner	0.862	0.294
	Surprise * Relatives	0.455	0.281
	Surprise * Friend/Neighbor	0.456	0.739

Table 5. Significance results for logistic regression from mother changing smoking habits for Sweep 1. Table shows log odds and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

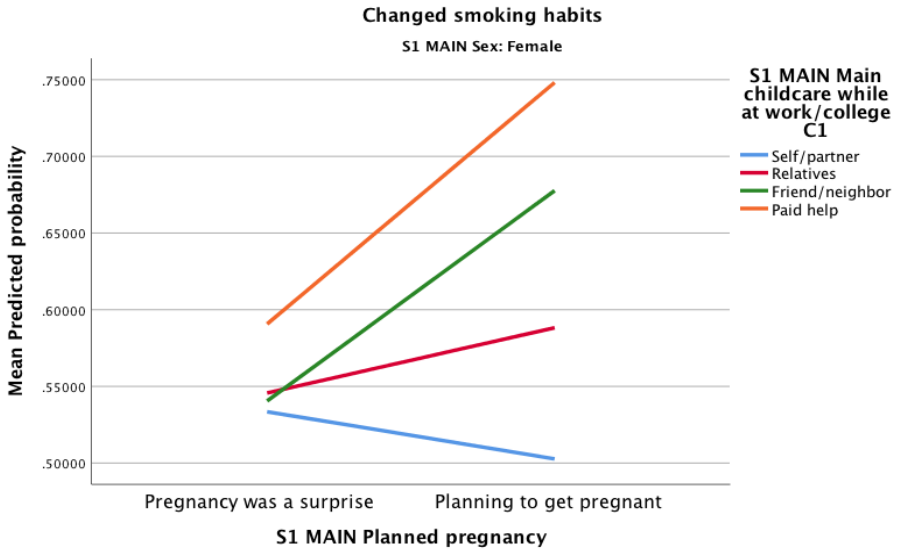

Figure 2. Interaction of intention status with main form of childcare on whether a mother changed her smoking habits during prenancy

Table 6 Sweep 1 – Main effects on tobacco cessation

Variables	Changed smoke habits	
Planned Pregnancy	Log Odds	S.E
Surprise	0.021	0.174
Main Childcare		
Self/ Partner	reference	
Relatives	0.294	0.19
Friend/ Neighbor	-0.402	0.772
Paid help	0.76	0.267
Freq. w/ Friends		
Everyday	reference	
No Friends/ Not at all	-0.19	0.369
1-2 times	0.297	0.355
3-6 times	0.242	0.399
Fam would help		
Family would help if financial problems	-0.033	0.096
Happy/ Unhappy		
Happy/ Unhappy with relationship	0.136	0.059

Table 6. Results for logistic regression predicting mother changing smoking habits in Sweep 1. Table shows log odds and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

For breastfeeding duration, there is an interaction between planned pregnancy and main form of childcare. Breastfeeding was measured from 0 to 365 days, with children who were still breastfeeding at time of interview coded as 365 days. As with the previous model, I found a significant interaction between type of childcare arrangement and intention status. For mothers (or their partners) who provided childcare themselves and their pregnancies were a surprise, their children were breastfed longer, on average, than those children who were in paid childcare and were a surprise by approximately 20 days after controlling for other factors ($p = 0.02$; see Table 7). This is not surprising due to the fact that mothers who stay at home are able to breastfeed for extended periods of time compared to mothers who are relying on paid help. Contrary to predictions, children resulting from "surprise" pregnancies are associated with a breastfeeding duration that is longer than planned children by about 14 days ($p = 0.014$; see Table 8 for details). Similarly to the last model, all categories of childcare result in lowered investment if the pregnancy is unplanned with the exception of self/partner (see Figure 3). While unplanned pregnancy is a significant predictor of breastfeeding duration in the opposite direction than expected, this could be due to confounding cultural variables that are not taken into account by the data set.

Table 7 Sweep 1 – Interaction effects on breastfeeding duration

	Breastfeed duration	
Planned Pregnancy	**B**	**S.E**
Surprise	-4.406	6.273
Main Childcare		
Self/Partner	-6.53	5.259
Relatives	-14.209	4.816
Friend/Neighbor	-0.812	15.547
Paid help	reference	
Interactions		
Planned * Paid Help	reference	
Surprise * Self/Partner	20.799	8.964
Surprise * Relatives	5.87	8.297
Surprise * Friend/Neighbor	-24.761	23.506

Table 7. Significance results of multiple linear regression for breastfeeding duration in days for Sweep 1. Table shows slope and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

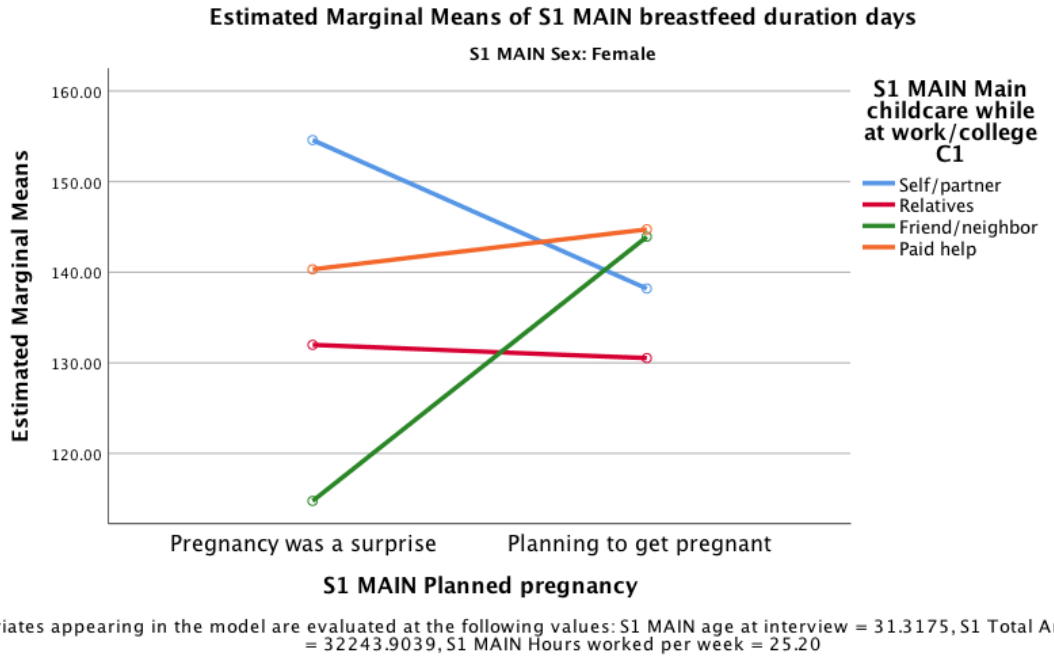

Figure 3. Interaction of intention status with main form of childcare on breastfeeding duration in days

Table 8 Sweep 1 – Main effects on breastfeeding duration

Variables	Breastfeed duration	
Planned Pregnancy	B	S.E
Surprise	14.024	5.715
Main Childcare		
Self/Partner	4.321	7.341
Relatives	-10.674	7.051
Friend/Neighbor	-31.389	23.368
Paid help	reference	
Freq. w/ Friends		
Everyday	reference	
No Friends/ Not at all	-3.015	13.173
1-2 times	-6.596	12.865
3-6 times	4.306	14.1
Fam would help		
Family would help if financial problems	-0.018	2.942
Happy/Unhappy		
Happy/Unhappy with relationship	3.307	1.883

Table 8. Results of multiple linear regression for breastfeeding duration in days for Sweep 1. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Main form of childcare remains a significant moderator of intention status when looking at childcare costs. Mothers who relied on friends or neighbors as their main source of childcare spent approximately 20 pounds less per week than mothers who relied on paid help ($p = 0.049$), unless the pregnancy was a surprise, in which case, they actually spent £50 more per week than if their child was in paid help ($p < 0.001$; see Table 9). In this case, investment remains around the same amount between planned and unplanned children unless the main form of childcare is a friend or neighbor, which is difficult to interpret due to the fact that the reference category is paid help, and the expectation is that mothers spend more money on paid help. However, this may be due to

the fact that mothers who rely on paid help spend about the same on childcare regardless of whether a child is planned or not (see Figure 4).

Main form of childcare is a significant predictor for amount spent for childcare costs when only considering the main effects. For families in which the mother or her partner are the main form of childcare, mothers spent on average approximately 40 pounds less per week than mothers who used paid help ($p < 0.001$), and mothers who had relatives as the main form of childcare spent approximately 32 pounds less per week ($p < 0.001$; see Table 10). This is not surprising, because mothers will not be spending as much on childcare if they are not using paid help, particularly the closer the main form of care is to the mother herself.

Table 9 Sweep 1 – Interaction effects on childcare costs

	Childcare Costs	
Planned Pregnancy	**B**	**S.E.**
Surprise	-3.99	3.067
Main Childcare		
Self/Partner	-43.331	5.467
Relatives	-36.377	3.497
Friend/Neighbor	-30.751	8.636
Paid help	reference	
Interactions		
Surprise * Paid Help	reference	
Surprise * Self/Partner	3.591	9.527
Surprise * Relatives	6.045	5.862
Surprise * Friend/Neighbor	72.367	14.243

Table 9. Results for multiple linear regression for childcare costs in Sweep 1. Table shows unstandardized beta coefficient (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

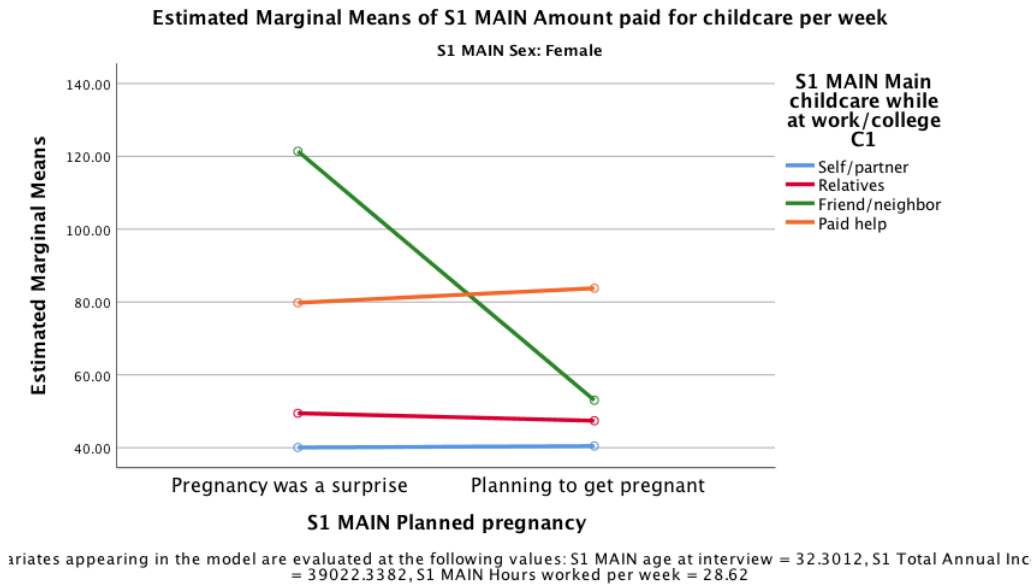

Figure 4. Interaction of intention status with main form of childcare on childcare costs

Table 10 Sweep 1 – Main effects on childcare costs

Variables	Childcare Costs	
Planned Pregnancy	B	S.E.
Surprise	-0.561	3.164
Main Childcare		
Self/ Partner	-39.288	5.143
Relatives	-32.214	3.523
Friend/ Neighbor	-18.729	9.491
Paid help	reference	
Freq. w/ Friends		
Everyday	reference	
No Friends/ Not at all	-6.829	7.45
1-2 times	-9.321	7.227
3-6 times	-7.289	7.795
Fam would help		
Family would help if financial problems	-2.857	1.587
Happy/ Unhappy		
Happy/ Unhappy with relationship	0.373	1.002

Table 10. Significance results for multiple linear regression for childcare costs in Sweep 1. Table shows slope (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

For birthweight, planned pregnancy is a significant predictor of a child's birthweight depending on the mother's main form of childcare. Particularly, children who are from an unplanned pregnancy and are cared for by relatives have slightly reduced birthweight in ounces by approximately 0.26 ounces ($p = 0.035$; see Table 11) compared to children who come from planned pregnancies and are in paid childcare. While this is statistically significant, 0.26 ounces is not biologically meaningful and doesn't indicate a great difference in parental investment. This is particularly evident when looking at the interaction plot (see Figure 5), in which all forms of childcare result in reduced birthweight if a child is unplanned with the exception of paid help.

Table 11 Sweep 1 – Interaction effects on birthweight in ounces

	Birthweight	
Planned Pregnancy	**B**	**S.E**
Surprise	0.68	1.002
Main Childcare		
Self/Partner	2.105	0.831
Relatives	1.719	0.757
Friend/Neighbor	1.374	2.364
Paid help	reference	
Interactions		
Surprise * Paid Help	reference	
Surprise * Self/Partner	-1.743	1.378
Surprise * Relatives	-2.662	1.26
Surprise * Friend/Neighbor	-2.678	3.481

Table 11. Results for multiple linear regression for childcare costs in Sweep 1. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

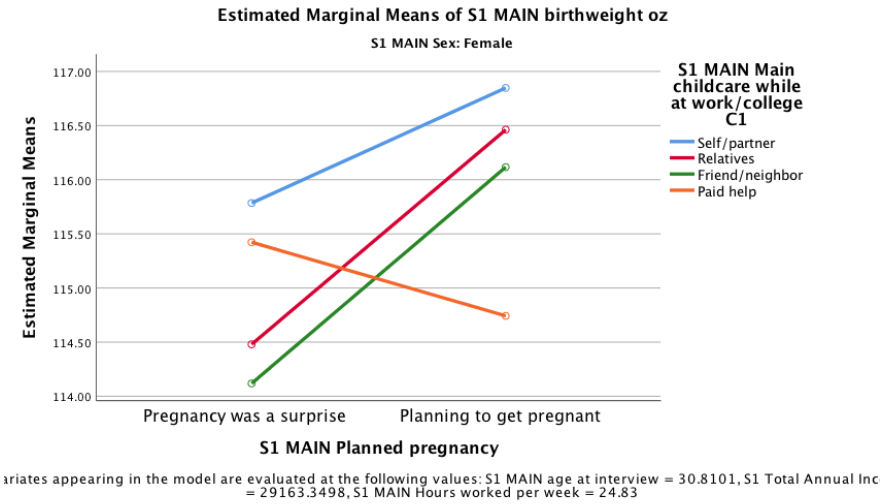

Figure 5. Interaction of intention status with main form of childcare on birthweight (measured in ounces)

Sweep Two

For sweep two results, there were no statistically significant interactions. However, when examining the main effects, the main form of childcare and whether family would help were significant predictors of whether a mother felt close to her child. The odds that a mother reported feeling "very close" to her child was about 8 times more (p=0.012) if she relied on paid help compared to providing childcare herself (or with her partner) and mothers who felt more confidently that their family would help during times of financial struggle were 1.8 times more likely to report having a warm, affectionate relationship with her child (p= 0.003; see Table 12). Based on my prediction, we would not expect mothers to report feeling closer to their child when relying on a form of childcare other than themselves or their partners, but these results may suggest such; however, based on my prediction we would expect to see mothers who perceive increased support from their family to have a closer relationship with their children.

Table 12 Sweep 2 – Main effects on closeness to child

	SWEEP 2	
Variables	Close w/ child	
Planned Pregnancy	Log Odds	S.E
Surprise	-0.225	0.647
Main Childcare		
Self/Partner	reference	
Relatives	0.831	0.718
Friend/Neighbor	1.279	1.197
Paid help	2.134	0.846
Fam would help		
Family would help if financial problems	0.601	0.2
Happy/Unhappy		
Happy/Unhappy with relationship	0.199	0.17
N Valid	385	
N Missing	14894	

Table 12. Results for logistic regression for closeness to child in Sweep 2. Table shows log odds and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Sweep Three

The frequency a child saw his/her grandparents and his/her other relatives were both moderators of planned pregnancy on the frequency of time a mother spent with her child. Time spent with a child was measured on a continuous scale from 1 to 32, in which time spent with child is measured as the sum of multiple activities a mother did with her child (such as frequency a mother read to her child, played indoor games with her child, made music with her child, etc.) scored on a Likert scale of (0) not at all to (5) every day. Children that were the result of an unplanned pregnancy and saw their grandparents several times a week were associated with mothers who spent less time with their child

compared to those children who saw their grandparents several times a week, but were the result of planned pregnancy (p = 0.037; see Table 13), and while there is a general trend of reduced time with children resulting from unplanned pregnancies compared to children that were planned depending on how frequently they saw their grandparents, the greatest difference is between children that resulted from unplanned pregnancies seeing their grandparents several times a week having significantly less time with their mothers than *planned* children seeing their grandparents several times a week (see Figure 6). This follows the idea that allocare is provided to reduce resource stress on a mother, and if a mother has an unplanned child with supportive relatives who can provide allocare, she will be spending less time resources on her children.

Table 13 **Sweep 3 – Interaction effects; frequency child sees grandparents on time spent with child**

	SWEEP 3	
DV	Time Spent w/ child	
Variables	B	S.E
Planned Pregnancy		
Surprise	-0.007	0.229
Frequency sees grandparents		
Not at all	0.213	0.854
Less often	-0.849	0.278
Once or twice a month	-0.757	0.247
Once or twice a week	-0.703	0.203
Several times a week	-0.023	0.212
Every day or almost every day	reference	
Interaction		
Surprise * not at all	-0.332	1.228
Surprise * less often	0.081	0.452
Surprise * 1-2 times/month	-0.153	0.4
Surprise * 1-2 times/week	-0.057	0.318
Surprise * several times a week	-0.684	0.329
Surprise * every day	reference	

Table 13. Significance results for multiple linear regression for time spent with child in Sweep 3. Table shows slope (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

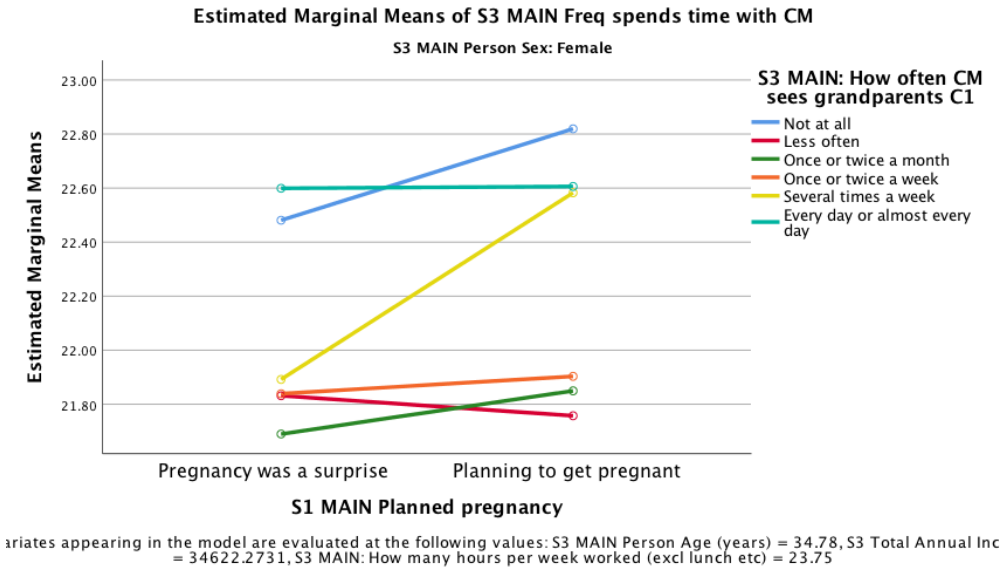

Figure 6. Interaction of intention status with frequency child sees grandparents on how frequently a mother spends time with her child

The frequency with which children saw relatives other than their grandparents reported similar results, in which children that saw their other relatives several times a week were slightly less likely to spend time with their moms than mothers who had unplanned pregnancies and their child see his/her relatives daily ($p = 0.032$; see Table 14). This appears less meaningful than the frequency a child sees his/her grandparents though, where the only difference between the frequency a child sees his/her other relatives and being planned vs. unplanned is that most categories remained relatively the same, but seeing other relatives several times a week resulted in a slight drop of investment compared to other frequencies (see Figure 7).

Table 14 Sweep 3 – Interaction effects; frequency child sees relatives other than grandparents on time spent with child

	SWEEP 3	
DV	Time Spent w/ child	
Variables	B	S.E
Planned Pregnancy		
Surprise	0.288	0.377
Frequency sees other relatives		
Not at all	-1.08	0.696
Less often	-0.905	0.308
Once or twice a month	-0.434	0.297
Once or twice a week	0.134	0.297
Several times a week	0.723	0.33
Every day or almost every day	reference	
Interaction		
Surprise * not at all	0.475	1.074
Surprise * less often	-0.23	0.464
Surprise * 1-2 times/ month	-0.575	0.438
Surprise * 1-2 times/ week	-0.459	0.433
Surprise * several times a week	-1.033	0.481
Surprise * every day	reference	

Table 14. Results for multiple linear regression model of time spent with child in Sweep 3. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

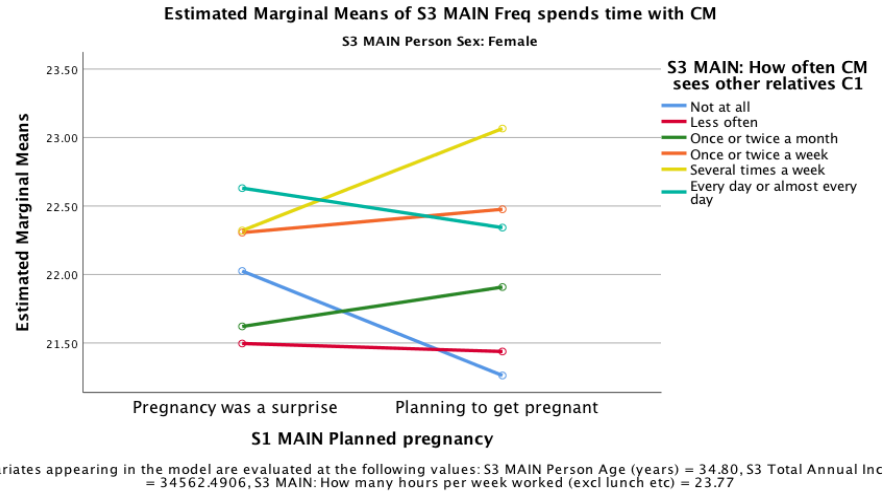

Figure 7. Interaction of intention status with frequency a child sees his/her relatives (other than grandparents) on the frequency a mother spends time with her child

Sweep Four

In sweep 4, there is a significant interaction between planned pregnancy and main form of childcare when predicting closeness with child. How close a mother felt to her child was measured on a continuous scale between 1 and 14. For mothers who reported that their children were a surprise and their main childcare is a friend or neighbor, their reported closeness with the child is greater than mothers who reported their children were a surprise and the main childcare is "other" ($p = 0.034$; see Table 15). As indicated in the plot below, mothers who reported their pregnancies as unplanned but had support from friends or neighbors as their main form of childcare were significantly more close their children than mothers who relied of friends or neighbors if their children were planned (see Figure 8). While this follows my prediction, in which increased social support results in increased investment regardless of intention status, this is not true for all categories--only for friend/neighbor support.

Table 15 Sweep 4 – Interaction effects on how close a mother felt to her child

	SWEEP 4	
DV	How close	
Variables	B	S.E.
Planned Pregnancy		
Surprise	-0.184	0.073
Main Childcare Weekday		
Relatives	0.07	0.061
Friend/Neighbor	-0.202	0.143
Paid help	-0.061	0.094
Other	reference	
Interaction		
Surprise * relatives	0.131	0.098
Surprise * Friend/Neighbor	0.519	0.245
Surprise * Paid help	0.254	0.158
Surprise * Other	reference	

Table 15. Results for multiple linear regression for time how close a mother felt to her child in Sweep 4. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of

mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

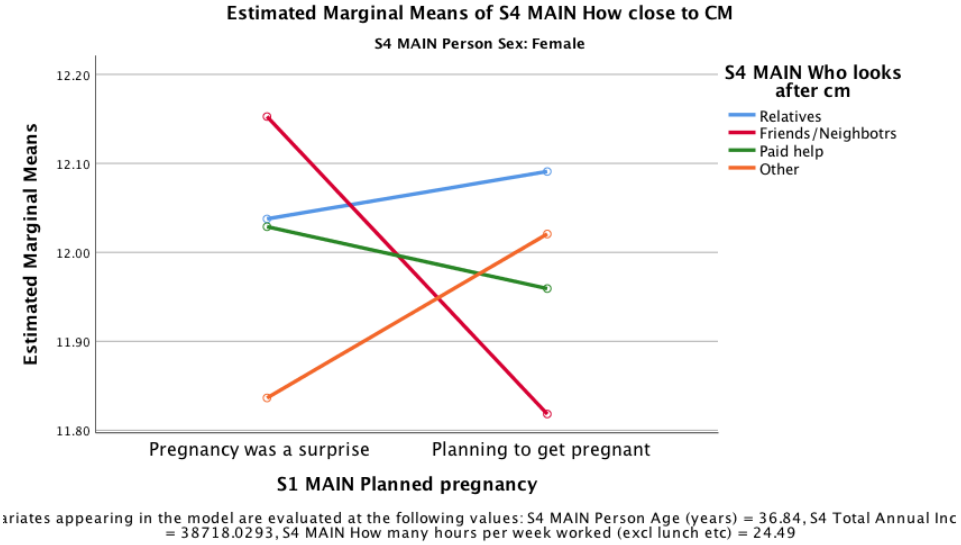

Figure 8. Interaction of intention status with main form of childcare on how close a mother felt to her child

Looking at main effects, mothers who had relatives as their main form of childcare had 1.16 increased odds of feeling close to their children compared to mothers who used "other" forms of childcare ($p = 0.043$), and happiness in a mother's current relationship slightly increased the odds (by 1.13) of a mother's relationship with her child ($p < 0.001$; see Table 16). It's difficult to interpret how relatives increase parental investment when compared to a category that is not clearly defined, it is understandable that mothers that are in a happier relationship would report feeling closer to their children.

Time spent with child in sweep 4 was also measured on a continuous scale between 1 and 34. For sweep 4, happiness in relationship and whether family or friends live nearby are significant predictors, but there are no significant interactions in the model. Mothers who feel happier in their relationship reported spending more time with

their child by 0.31 points per 1-unit increase of reported happiness (p = 0.002), and mothers who reported living close to friends scored 1.044 points higher than mothers who lived by both friends and family (p = 0.008). See Table 16 below for full model details.

Table 16 **Sweep 4 – Main effects for how close a mother felt to her child and the amount of time she spent with her child**

	SWEEP 4			
DV	How close		Time Spent w/ child	
Variables	B	S.E.	B	S.E.
Planned Pregnancy				
Surprise	0.025	0.072	0.284	0.317
Main Childcare Weekday				
Relatives	0.15	0.074	0.258	0.326
Friend/Neighbor	-0.085	0.195	-0.861	0.854
Paid help	0.079	0.127	0.232	0.555
Other	reference		reference	
Happy relationship				
happy/unhappy	0.122	0.022	0.31	0.097
Friends/Family in the area				
No	-0.258	0.161	-0.911	0.705
Yes, friends	-0.095	0.09	1.044	0.396
Yes, family	-0.12	0.178	-1.332	0.78
Yes, both	reference		reference	
N Valid	1306		1305	
N Missing	12086		12087	

Table 16. Results for multiple linear regression for time how close a mother felt to her child and the amount of time a mother spent with her child in Sweep 4. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Sweep Five

For sweep 5, almost all social support variables were significant in the model for the amount of time a mother spent with her child. First, the amount of time spent with a child was predicted by an interaction between intention status and how frequently a child saw their grandparents, and the happiness in a mother's current relationship. Children that were a result of an intended pregnancy who never saw their grandparents were less likely to spent time with their mother every day (p = 0.034; see Table 17) compared to children

that were the result of an unplanned pregnancy and never saw their grandparents. This interaction shows that regardless of intention status, children who see their grandparents daily (or almost daily) also have increased time spent with mothers (see Figure 9). This follows our prediction that reduced social support leads to reduced parental investment if children are unplanned, although it's possible to expect to this to go in the opposite direction so that mothers are relieved of providing resources if unplanned children are spending time with their grandparents. Mothers that were happier in their relationships and had planned pregnancies spent more time with their children compared to those who were less happy in their relationship. Mother's happiness in relationship has no association with time mother spends with her child for unplanned pregnancies (see Table 18 and Figure 10).

Table 17 **Sweep 5 – Interaction effects; frequency child sees grandparents on the amount of time spent with child**

		SWEEP 5	
		Time spent with cm	
DV		B	S.E.
Planned			
	Surprise	-0.039	0.133
Frequency sees grandparents			
	Not at all	-0.746	0.184
	Less often	-0.311	0.131
	Once or twice a month	-0.359	0.125
	Once or twice a week	-0.366	0.11
	Several times a week	-0.053	0.122
	Every day or almost every day	reference	
Interaction			
	Surpise * Not at all	0.579	0.274
	Surprise * Less often	0.17	0.21
	Surprise * Once or twice a month	-0.149	0.201
	Surprise * Once or twice a week	0.019	0.169
	Surprise * Several times a week	-0.197	0.187
	Surprise * Every day or almost	reference	

Table 17. Results for multiple linear regression for time spent with child in Sweep 5. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

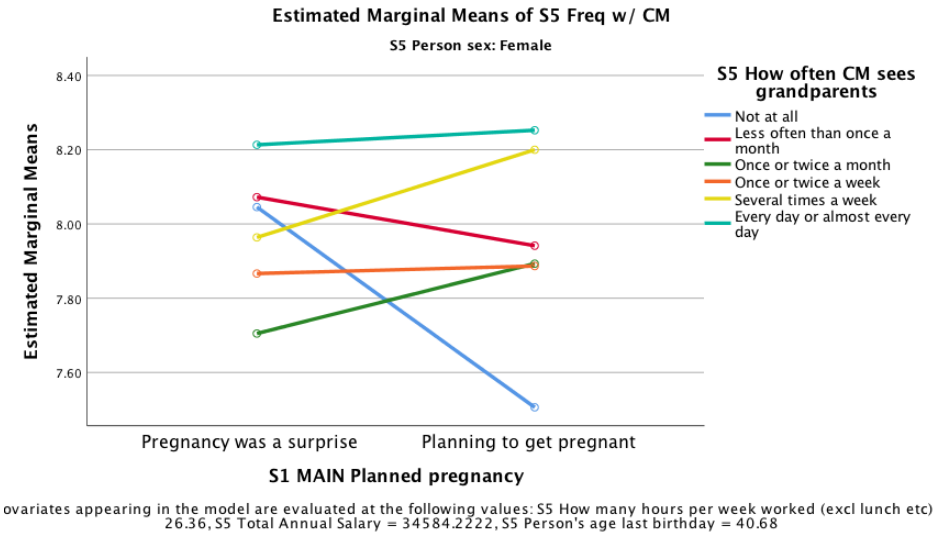

Figure 9. Interaction of intention status with frequency a child sees grandparents on the frequency a mother spends time with her child

Table 18 Sweep 5 – Interaction effects; happiness in relationship on time spent with child

	SWEEP 5	
	Time spent with cm	
DV	B	S.E.
Planned		
Surprise	0.541	0.273
Happy relationship		
Happy/ unhappy	0.094	0.028
Interaction		
Surprise * happy	-0.094	0.047

Table 18. Results for multiple linear regression for time spent with child in Sweep 5. Table shows unstandardized beta coefficients (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

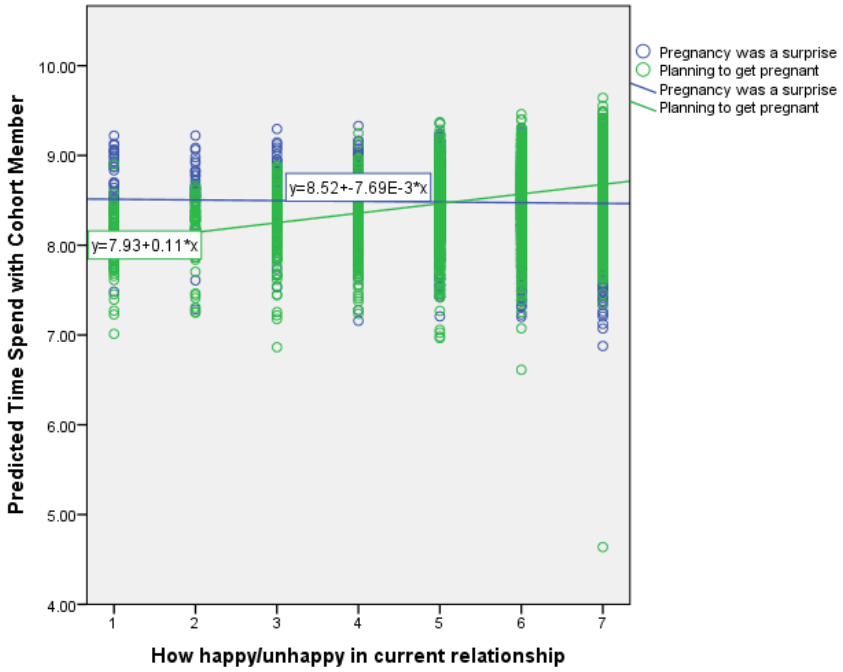

Figure 10. Interaction of intention status with happiness in current relationship on time spent with child

Looking at main effects, mothers who rely on relatives as the main form of childcare are 84% less likely to spend time with her child compared to mothers who rely on "other childcare" ($p = 0.034$; see Table 19). This could possibly due to the change of childcare categories, in which "other" may also include self/partner as a childcare option. This would explain the massive odds ratio, where mothers who are the main form of childcare will spend significantly more time with their children. Children who saw their grandparents everyday spent more time with their mothers compared to children who saw their grandparents less frequently ($p < 0.05$; see Table 19), except for children who never see their grandparents, which is not significantly different from seeing grandparents daily. A mother who had family in the area was less likely to spend time with her child compared to having no friends or family in the area ($p = 0.011$; see Table 19). This also follows the idea that children spending time with relative will not be spending time with

their mothers and will therefore show as reduced parental investment. Lastly, a mother who reported increased happiness in her current relationship was more likely to spend time with her child than a mother that was unhappy in her relationship (p = 0.009). This might indicate that parents who demonstrate happy relationships will also spend more time with children.

Table 19 Sweep 5 – Main effects on time spent with child

	SWEEP 5	
	Time spent with cm	
DV	B	S.E.
Planned		
Surprise	-0.038	0.068
Main Childcare Weekend		
Relatives	-0.047	0.076
Friend/Neighbor	-0.035	0.276
Paid help	-0.104	0.461
Other	reference	
Main Childcare Weekday		
Relatives	-0.16	0.075
Friend/Neighbor	-0.015	0.144
Paid help	0.075	0.137
Other	reference	
Frequency sees grandparents		
Not at all	-0.357	0.202
Less often	-0.476	0.131
Once or twice a month	-0.652	0.12
Once or twice a week	-0.508	0.099
Several times a week	-0.225	0.104
Every day or almost every day	reference	
Friends/Family in the area		
No	reference	
Yes, friends	0.043	0.125
Yes, family	-0.438	0.171
Yes, both	-0.08	0.12
Happy relationship		
Happy/unhappy	0.059	0.022

Table 19. Results for multiple linear regression for time spent with child in Sweep 5. Table shows unstandardized beta coefficients (B) and standard errors (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Sweep Six

How happy a mother was in her current relationship was a significant predictor of how close a mother felt to her child and how frequently she talked to her child about things that were important to him/her in sweep 6. In both models, a happier relationship slightly increased how close a mother felt to her child and how frequently she talked to him/her about things he/she felt were important ($p < 0.001$; see Table 20).

Table 20 **Sweep 6 – Main effects on how close a mother felt to her child and the frequency she spoke to him/her about things he/she felt were important**

	SWEEP 6			
	How close with child		Frequency talks to child	
	Log odds	S.E	Log odds	S.E.
Planned				
Surprise	-0.045	0.097	-0.119	0.066
Happy relationship				
Happy/ unhappy	0.12	0.022	0.081	0.016
N Valid	5141		5141	
N Missing	5944		5944	

Table 20. Results from logistic regression model for sweep six. Table shows number included in response (n), log odds and standard error (S.E) for each variable within each model. Highlighted cells indicate a significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level. Models in this table include how close mother is to child, and the frequency mother talks to their child about things important to him/her.

CHAPTER FOUR: DISCUSSION

Based on our results, evidence shows that planned pregnancy is correlated with parental investment in the earlier years of a child's life, while social support variables are correlated with parental investment indicators later in a child's life. Planned pregnancy was a significant predictor of almost all of our investment variables from sweep 1, with the exception of a mother quitting smoking, childcare costs, and birth weight, although surprise pregnancies resulted in longer breastfeeding lengths which is unexpected. Planned pregnancy did not appear to be significant at all in sweep 2, although our small sample size in this wave may reduce statistical power. Evidence also shows that planned pregnancy affects "physical," or maternal behavior investment variables, like vaccinations, birth weight, and breastfeeding, and social support affects emotional, variables, like how much time a mother spends with her child or how close of a relationship she has with her child. In sweeps 2 through 6, at least one social support variable remained significant for each model with the exception of vaccinations in sweep 3 and how often a mother read to her child in sweep 2. In particular, most of the social support variables negatively affected emotional variables like time spent with child or frequency of talking to child about things important to him/her. While I predicted increased social support to lead to increased parental support, it would make sense for time investment to be reduced if children are spending increased time with another caretaker such as grandparents or paid help. The trend of planned pregnancy affecting investment variables earlier in life could be due to the physical nature of the variables or

it could be due to the fact that these particular analyses did not include any physical variables past sweep 3 aside from school fees.

The purpose of this paper was to evaluate whether planned pregnancy affects the amount of parental investment mothers provide depending on the amount and type of social support they received. While there were no statistically significant interactions universally across all models, there were significant interactions in sweeps 1, 3, 4, and 5. In sweep 1, there were significant interactions between planned pregnancy and main form of childcare among four of the seven models run. Self/partner was a significant category for two of the models, but every other category was still significant in at least one model, and no model had all four categories with significant interactions. We would expect at least one category to remain significant across all models, but at least the "self/partner" category was significant for maternal behaviors. In sweeps three and five, there was a significant interaction between planned pregnancy and the frequency a child saw his/her grandparents. This interaction is difficult to interpret due to the ordinal values of the variable, and the only categories that were significant were "several times per week" and "not at all." Given the number of variables and interactions tested, it is possible this result represents a type I error. If the frequency of seeing grandparents was a significant predictor, we would expect to see all categories significant with either increasing or decreasing values depending on the direction of the effect. This is the same case for the frequency a child saw his/her other relatives, in which only "several times per week" was significant. In sweeps 4 and 5 there were significant interactions between planned pregnancy and whether friends or family lived nearby, however, both sweeps had different categories that were significant. Based on the results above, the answer to

whether social support is a true moderator of planned pregnancy based on intention status is inconclusive and requires additional research.

Surprisingly, there were not any independent variables that had a significant effect on the amount spent on childcare or on the child's schooling. We might expect that parents will pay more for better education, and previous studies have indicated planned children receive better education, particularly when they are first-born children (Hedges et al. 2016; Suitor and Pillemer 2007). We fail to see planned pregnancy having an effect on prenatal care as well, which is worrisome due to the fact that these are inconsistent with some of the literature available. Previously, Kost and colleagues (2017) have shown that mothers with planned pregnancies participate in specific prenatal maternal behaviors such as seeking out prenatal care and reducing tobacco use to a higher degree than those with unplanned pregnancies. It is possible the results from this study do not match the results from Kost and colleagues due to the fact that their study is from the US and this study is from the UK, and there is a discrepancy between the medical care available and costs associated with it. Another counterintuitive result is the increase of breastfeeding for unplanned children. One hypothesis that might explain this phenomenon would be the overcompensation hypothesis posed by Gowaty and colleagues which looked at cockroaches, fruit flies, pipefish, mallard ducks, and feral mice to see if reduced mate choice led to increased parental investment for children that are at a disadvantage due to lack of mate choice (Gowaty et al. 2007). Having an unplanned child with an undesirable mate is extremely plausible, and this could be considered a disadvantage to offspring; however, it is also possible to have an unplanned or mistimed child with a desirable partner, and if this concept were solely applied to disadvantages in general rather than

just mate choice unplanned children would receive additional parental investment across all models. Other explanations may include confounding variables like cultural norms that are not captured by the data, for example, whether formula is considered a greater investment than breastfeeding, or stigmas against breastfeeding.

When mentioning intention status, it is also important to consider that having a surprise pregnancy does not necessarily mean it is an unwanted pregnancy. Even if a pregnancy is wanted but unplanned, it is important to remember that an unplanned pregnancy can be the result of poor timing (Hrdy 2016), in which a mother may have been happy with her pregnancy, but may not have had necessary resources available due to the timing of the pregnancy which could result in reduced investment. The reverse can also be true, in which a mother may report as being unhappy with her pregnancy due to poor timing. I decided to test whether planned pregnancy is a good proxy of how wanted a pregnancy is by running a correlation between whether a pregnancy was planned and how happy the mother felt after discovering she was pregnant. How a mother felt when discovering she was pregnant was scored on a Likert scale ranging from “very unhappy” to “very happy.” Results indicate that happiness with pregnancy and planned pregnancy are positively correlated for mothers ($r = 0.587$, $p < 0.001$, $n = 18403$). Based on the western context of this study, I would expect mothers with mistimed pregnancies to report as unhappy due to the fact that mothers who are truly having an unplanned pregnancy that are absolutely unwanted have the option to either abort or give her child up for adoption.

Future Directions

The results of this study indicate that more work needs to be done investigating whether planned pregnancy truly affects parental investment, and how planned pregnancy and social support affect parental investment. Ideally, future studies would explore these effects in contexts beyond the United Kingdom. This could be challenging to collect, especially in cultures where pregnancy and fertility are less consciously decided or considered decisions made by God.

A limitation of this study is standardization between sweeps regarding social support variables. The variable "frequency with friends" was only present in sweep 1 and sweep 3, and "family would help" was only present in the first two sweeps. To truly be able to compare social support and its effects on parental investment, it would be worth having the same variables for support from friends, support from family, and support from partner for each sweep. An unintentional trend in this analysis was the decreasing number of investment variables as children grew older. Being able to compare a greater number of investment variables later in life could be beneficial, particularly if there were an equal number of physical and social variables. This would be an improvement over this study, where all of the physical variables early in life and most of the social variables later. This study's results reflect intention status and the amount of social support a mother is receiving at the time of the questionnaire. To be all encompassing, future studies should include social support prior to birth to explain whether social support truly influences intention status. Lastly, including analysis of siblings to compare intention status within families could provide a more powerful test of our hypothesis.

CHAPTER FIVE: CONCLUSION

This paper looked into the roles of intention status and social support on parental investment. Based on life history theory, mothers rely on additional help for childrearing (Kramer 2010), and in cases where a mother may not have enough support, this may result in unplanned or mistimed pregnancies due to lack of resources (Hrdy 1992; Kramer 2010; Mosher, Jones & Abma 2012). There is evidence of family planning holding importance throughout our evolutionary history from concoctions and birth spacing hundreds of years ago (Bengtsson and Dribe 2006; Boomgaard 2003; Cirrinella and Klemp 2017; Gribaldo, Judd, and Kertzer 2009; Sainz De La Maza Kaufmann 1997) to modern contraception today. Several studies previously have shown that unintended pregnancy can lead to reduced parental investment (Barber & East 2009; Bartlett et. al. 2017; Kost, Landry, and Darroch 2017; Lepper et al. 2015; Ren, Chen, and Stanton 2012). Social support also remains an important factor in parental investment, although increased social support leads to decreased parental investment (Hames & Draper 2009; Hawkes and Smith 2009; Hrdy 2009; Kramer and Veile 2018; Sear and Mace 2008). This study examined the effects of intention status and social support on parental investment, particularly to see if social support moderates intention status; while there were not results to support that social support universally moderates planned pregnancy, results still indicate that planned pregnancy and social support affect aspects of parental investment. In particular, planned pregnancy affects maternal behaviors, whereas social support affects emotional and social measurements of investment. While this study found

that social support and intention status have a relationship, results were ambiguous and difficult to interpret. To better close the gap in the literature, multiple steps should be taken to improve our understanding of intention status and social support on parental investment. First, future studies should examine additional cross-cultural data to get a better understanding of the universality of intention status and social support on parental investment, as well as explore other methods of investment across multiple cultures. Second, studies should examine pre-birth social support to connect whether social support prior to birth affects intention status and then parental investment, or if it only has an effect after birth. Third, standardized behavioral and emotional variables should be included in surveys and analysis to ensure measurements are easily understandable and properly comparable. Fourth, future studies will need standardization of social support variables to ensure social support is interpreted correctly through analysis. And lastly, studying intrafamilial intention status may provide insight on the effect of intention status and social support on parental investment that may extend past the quantity-quality tradeoff.

REFERENCES

Barber, Jennifer S. and Patricia L. East. 2009. "Home and Parenting Resources Available to Siblings Depending on Their Birth Intention Status." *Child Development* 80(3):921–39.

Barker, D. J. 1995. "Fetal Origins of Coronary Heart Disease." *British Medical Journal* 311:171–74.

Bartlett, Jessica Dym, Chie Kotake, Rebecca Fauth, and M. Ann Easterbrooks. 2017. "Intergenerational Transmission of Child Abuse and Neglect: Do Maltreatment Type, Perpetrator, and Substantiation Status Matter?" Child Abuse & Neglect 63:84–94.

Bengtsson, Tommy and Martin Dribe. 2006. "Deliberate Control in a Natural Fertility Population: Southern Sweden, 1766–1864*." *Demography* 43(4):727–46.

Boomgaard, Peter. 2003. "Bridewealth and Birth Control : Low Fertility in the Indonesian Archipelago , 1500-1900." *Population and Development Review* 29(2):197–215.

Chapais, Bernard. 2008. Primeval Kinship: How Pair-Bonding Gave Birth to Human Society. Harvard University Press.

Cinnirella, Francesco and Marc Klemp. 2017. "Malthus in the Bedroom : Birth Spacing as Birth Control in Pre-Transition England." *Demography* 54:413–36.

Dott, Mary, Sonja A. Rasmussen, Carol J. Hogue, and Jennita Reefhuis. 2009. "Association Between Pregnancy Intention and Reproductive- Health Related Behaviors Before and After Pregnancy Recognition , National Birth Defects Prevention Study , 1997 – 2002." *Maternal and Child Health Journal* 14:373–81.

Fite, Jeffrey E. et al. 2005. “Opportunistic Mothers: Female Marmosets (Callithrix Kuhlii) Reduce Their Investment in Offspring When They Have to , and When They Can.” *Journal of Human Evolution* 49:122–42.

Gowaty, Patricia Adair et al. 2007. “The Hypothesis of Reproductive Compensation and Its Assumptions about Mate Preferences and Offspring Viability.” *PNAS* 104(38):15023–27.

Gribaldo, Alessandra, Maya D. Judd, and David I. Kertzer. 2009. “An Imperfect Contraceptive Society : Fertility and Contraception in Italy.” *Population and Development Review* 35(3):551–84.

Hagen, Edward H. 1999. “The Functions of Postpartum Depression.” *Evolution and Human Behavior* 20:325–59.

Hall, Jennifer A., Lorna Benton, Andrew Copas, and Judith Stephenson. 2017. “Pregnancy Intention and Pregnancy Outcome : Systematic Review and Meta-Analysis.” *Maternal and Child Health Journal* 21(3):670–704.

Hames, Raymond and Patricia Draper. 2004. “WOMEN ’ S WORK , CHILD CARE , AND HELPERS-AT-THE-NEST IN A HUNTER-GATHERER SOCIETY.” *Human Nature* 15(4):319–41.

Hamilton, WD. 1964. “The Genetical Evolution of Social Behaviour I and II.” *Journal of Theoretical Biology* 7(1):1–16.

Hawkes, Kristen and Ken R. Smith. 2009. “Brief Communication: Evaluating Grandmother Effects.” *American Journal of Physical Anthropology* 140(1):173–76.

Hedges, Sophie, Monique Borgerhoff Mulder, Susan James, and David W. Lawson. 2016. “Sending Children to School: Rural Livelihoods and Parental Investment in Education in Northern Tanzania.” *Evolution and Human Behavior* 37(2):142–51.

Hrdy, Sarah Blaffer. 1992. “Fitness Tradeoffs in the History and Evolution of Delegated Mothering with Special Reference to Wet-Nursing, Abondonment, and Infanticide.” *Ethology and Sociobiology* 442(13):409–42.

Hrdy, Sarah Blaffer. 2009. *Mothers and Others: The Evolutionary Origins of Mutual Understanding*. First Edit. Cambridge, Massachusetts: The Belknap Press of Harvard University Press.

Hrdy, Sarah Blaffer. 2016. "Of Marmosets , Men , and the Transformative Power of Babies." Pp. 177–203 in *Costly and Cute*, edited by W. R. Trevathan and K. R. Rosenberg. Santa Fe, Albuquerque: University of New Mexico Press.

Kost, Kathryn, David J. Landry, and Jacqueline E. Darroch. 2017. "Predicting Maternal Behaviors During Pregnancy : Does Intention Status Matter ?" *Family Planning Perspectives* 30(2):79–88.

Kramer, Karen L. 2010. "Cooperative Breeding and Its Significance to the Demographic Success of Humans." *Annu* 39:417–36.

Kramer, Karen L. and Amanda Veile. 2018. "Physiology & Behavior Infant Allocare in Traditional Societies." *Physiology & Behavior* 193(February):117–26. Retrieved (https://doi.org/10.1016/j.physbeh.2018.02.054).

Lepper, Leigh E. Tenkku et al. 2015. "Socioeconomic Status , Alcohol Use , and Pregnancy Intention in a National Sample of Women." *Society for Prevention Research* 17:24–31.

Rackin, Heather M. and Melanie Sereny Brasher. 2016. "Is Baby a Blessing ? Wantedness , Age at First Birth , and Later-Life Depression." *Journal of Marriage and Family* 78(October):1269–84.

Sainz De La Maza Kaufmann, Marta. 1997. "Contraception in Three Chibcha Communities and the Concept of Natural Fertility '." *Current Anthropology* 38(4):681–87.

Salmon, Catherine A. and James Malcolm. 2015. *Oxford Handbook of Evolutionary Psychology*. 4th ed. edited by C. A. Salmon and T. K. Shackelford. Oxford University Press.

Sear, Rebecca and Ruth Mace. 2008. "Who Keeps Children Alive? A Review of the Effects of Kin on Child Survival." *Evolution and Human Behavior* 29(1):1–18.

Suitor, J. Jill and Karl Pillemer. 2007. “Mother’s Favoritism in Later Life: The Role of Children’s Birth Order.” *Research on Aging* 29(1):32–55.

Wellings, Kaye et al. 2013. “The Prevalence of Unplanned Pregnancy and Associated Factors in Britain : Findings from the Third National Survey of Sexual Attitudes and Lifestyles (Natsal-3).” *The Lancet* 382(9907):1807–16. Retrieved (http://dx.doi.org/10.1016/S0140-6736(13)62071-1).

APPENDIX A

Tables not included in Results Section

Table A.1 Sweep 1 – Main effects on any vaccinations

		SWEEP 1	
Variables		Any vaccines	
Planned Pregnancy		Log Odds	S.E
	Surprise	-0.985	0.46
Main Childcare			
	Self/Partner	reference	
	Relatives	0.039	0.512
	Friend/Neighbor	16.49	5979.457
	Paid help	0.596	0.627
Freq. w/ Friends			
	Everyday	reference	
	No Friends/ Not at all	0.881	0.911
	1-2 times	0.224	0.831
	3-6 times	0.104	0.929
Fam would help			
	Family would help if financi	0.276	0.21
Happy/Unhappy			
	Happy/Unhappy with relatic	0.076	0.138

Table A.1. Results from Any Vaccines model for Sweep 1. Table shows log odds and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result ($p = 0.032$). Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Table A.2 Sweep 1 – Main effects on prenatal care

		SWEEP 1		
Variables		Prenatal Care		
Planned Pregnancy		Log Odds	S.E	p-value
	Surprise	-0.22	0.354	0.534
Main Childcare				
	Self/Partner	reference		0.963
	Relatives	-0.167	0.393	0.671
	Friend/Neighbor	-0.452	1.114	0.685
	Paid help	-0.137	0.552	0.804
Freq. w/ Friends				
	Everyday	reference		0.175
	No Friends/ Not at all	0.449	0.594	0.449
	1-2 times	0.913	0.601	0.129
	3-6 times	1.662	0.894	0.063
Fam would help				
	Family would help if financial pro	-0.022	0.188	0.906
Happy/Unhappy				
	Happy/Unhappy with relationshi	-0.062	0.12	0.604

Table A.2. Results from prenatal care model for Sweep 1. Table shows log odds, standard error (S.E), and p-value for each variable within the model. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Table A.3 Sweep 2 – Main effects on how often a child was read to

		SWEEP 2		
Variables		How often read to cm		
Planned Pregnancy		Log Odds	S.E	p-value
	Surprise	0.065	0.244	0.789
Main Childcare				
	Self/Partner	reference		0.206
	Relatives	0.586	0.313	0.061
	Friend/Neighbor	0.661	0.532	0.214
	Paid help	0.162	0.3	0.589
Fam would help				
	Family would help if financi	-0.015	0.1	0.878
Happy/Unhappy				
	Happy/Unhappy with relatic	0.079	0.076	0.3

Table A.3. Results from how often a child was read to model for Sweep 2. Table shows log odds, standard error (S.E), and p-value for each variable within the model. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Table A.4 Sweep 3 – Main effects on number of vaccinations

		SWEEP 3		
DV		Vaccinations		
Variables		B	S.E	p-value
Planned Pregnancy				
	Surprise	0.141	0.148	0.342
S3 MAIN Who looks after CM term-time weekdays C1 MC1				
	relatives	-0.173	0.172	0.315
	Friends/Neighbors	-0.059	0.407	0.884
	Paid help	-0.177	0.262	0.499
	Other	reference	.	
S3 MAIN Who looks after CM term-time weekend C1 MC1				
	Relatives	-0.025	0.164	0.879
	Friends/neighbors	0.826	0.801	0.303
	Paid help	-0.597	0.893	0.504
	other	reference	.	
S3 MAIN: Time spent with friends in past week				
	No friends	0.537	1.087	0.621
	Not at all	-0.266	0.276	0.335
	1-2 times	-0.119	0.252	0.637
	3-6 times	-0.274	0.284	3.35E-01
	Every day	reference	.	
Frequency sees other relatives				
	Not at all	0.133	0.68	0.845
	Less often	-0.214	0.306	0.485
	Once or twice a month	-0.242	0.279	0.386
	Once or twice a week	-0.062	0.268	0.818
	Several times a week	0.018	0.292	0.951
	Every day or almost every day	reference		
Frequency sees grandparents				
	Not at all	0.168	0.786	0.831
	Less often	0.309	0.324	0.34
	Once or twice a month	-0.111	0.285	0.697
	Once or twice a week	-0.139	0.212	0.511
	Several times a week	-0.08	0.203	0.691
	Every day or almost every day	reference		

Table A.4. Significance results for multiple linear regression for number of vaccinations in Sweep 3. Table shows slope (B),standard error (S.E), and p-value for each variable within the model. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.

Table A.5 Sweep 6 – Main effects on school fees

		SWEEP 6		
		School fees		
		B	S.E	p-value
Planned				
	Surprise	-0.048	0.06	0.187
Happy relationship				
	Happy/unhappy	-0.018	0.014	0.421

Table A.5. Significance results for multiple linear regression for school fees in Sweep 6. Table shows slope (B) and standard error (S.E) for each variable within the model. Highlighted cells indicate a statistically significant result. Variables controlled for include age of mother, ethnicity, country of residence, total annual income, number of hours worked per week, religion, and education level.