

FATHER ABSENCE, PATERNAL INVESTMENT, AND
ALLOPARENTAL INVESTMENT EFFECTS ON
CHILDREN'S EDUCATIONAL ATTAINMENT
IN RURAL BANGLADESH

A Thesis presented to the Faculty of the Graduate School

University of Missouri

In Partial Fulfillment
Of the Requirements for the Degree

Master of Arts

by
MELISSA DAWN STEFFAN

Dr. Mary Shenk, Thesis Supervisor

JULY 2012

The undersigned, appointed by the Dean of the Graduate School, have examined the thesis entitled

FATHER ABSENCE, PATERNAL INVESTMENT, AND ALLOPARENTAL INVESTMENT EFFECTS ON CHILDREN'S LEVEL OF EDUCATIONAL ATTAINMENT IN RURAL BANGLADESH

Presented by Melissa Dawn Steffan,

A candidate for the degree of Master of Arts

And hereby certify that in their opinion it is worthy of acceptance.

Assistant Professor Mary K. Shenk

Professor Mark V. Flinn

Professor David C. Geary

DEDICATION

Thank you Michael and Linda Steffan, my wonderful parents, for your continuous support of everything I pursue. Thank you for never questioning my decisions in life and for always encouraging me to set goals that are motivated by personal passion rather than concern over others' expectations. Your love and leadership have helped me in the completion of this thesis and will continue to influence my future.

I would also like to thank my loving boyfriend Guy Liuzzi for his energy and sense of humor, which helped keep a smile on my face throughout my career as a graduate student. Thank you for always reminding me of the silver lining in any situation and for seeing eye-to-eye with me on what we choose to prioritize in our short lives. You have been my rock.

ACKNOWLEDGEMENTS

I would like to thank my committee chair and advisor, Dr. Mary K. Shenk, for many hours spent reading and helping me sort out my ideas. Thank you for offering me your data and field site, for your insightful revisions, and for always being available to help me throughout every stage of my graduate experience. Thank you for giving me a chance in the program, for believing in me, and for setting the bar high.

I would also like to thank the National Science Foundation for funding the data collection in Dr. Shenk's project, from which data was used in this thesis (Award No. BCS-0924630). Thank you also to Katie Starkweather, my office mate and friend, for pulling all of the data used in this thesis.

I would also like to thank my committee member and supervisor Dr. Mark V. Flinn for inspiring me to continue thinking interdisciplinarily and for his endless belief in my abilities to succeed. I am forever grateful for the multiple teaching assistantships you awarded me, which made it possible to complete this thesis and to earn my Master's degree.

I would also like to thank Dr. David C. Geary in the Department of Psychology. Thank you for always being responsive and for giving honest critiques. Your openness to my approach and understanding of my weaknesses helped more than you know.

I would like to thank the rest of the Department of Anthropology (faculty, staff, and students) for their encouragement and open-door policy that enabled me to get the advice I needed to succeed in the program.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....ii

LIST OF ILLUSTRATIONS.....v

LIST OF TABLES.....vi

ABSTRACT.....vii

Chapter

1. INTRODUCTION.....1

2. PSYCHOLOGY LITERATURE.....3
Father Absence and Children’s Educational Attainment
Limitations and Assumptions of the Psychological Approach

3. ANTHROPOLOGY LITERATURE.....12
Paternal Investment: Influences and Motivations
Father Absence and Low Investment
Alloparental Investment and Cooperative Breeding

4. STUDY POPULATION.....22
Father Absence in Matlab
Female Headed Households in Matlab
Labor Migration and Children’s Education

5. HYPOTHESES AND PREDICTIONS.....26
Parental Investment Theory
Cooperative Breeding Theory

6. METHODS.....31
Sample
Father Absence Categories
Paternal Investment Categories
Alloparental Investment Categories
Outcome Variable
Control Variables
Analytical Methods

7. RESULTS.....	41
Summary Statistics	
Father Absence and Children’s Level of Educational Attainment	
Paternal Investment and Oldest Sons’/Oldest Daughters’ Levels of Educational Attainment	
8. DISCUSSION.....	62
Conclusion	
 BIBLIOGRAPHY.....	 69

LIST OF ILLUSTRATIONS

Figure	Page
1. Histogram of Educational Attainment for All Children.....	42
2. Histogram of Educational Attainment for Children..... Finished With School.	42
3. Boxplot for Children's Educational Attainment by Type of Father Absence.	48
4. Boxplot for Children's Educational Attainment by Direct..... Alloparental Investment.	49
5. Boxplot for Children's Educational Attainment by <i>Bari</i> Residence.	50
6. Boxplot for Oldest Sons' Educational Attainment by Time..... Spent With Father.	56
7. Boxplot for Oldest Daughters' Educational Attainment by..... Time Spent With Father.	57

LIST OF TABLES

Table	Page
1. Summary Statistics for All Children.....	44
2. Summary Statistics for Oldest Sons.....	45
3. Summary Statistics for Oldest Daughters.....	46
4. Regression Results for All Children.....	54
5. Regression Results for Oldest Sons.....	60
6. Regression Results for Oldest Daughters.....	61
7. Summary of Results.....	62

FATHER ABSENCE, PATERNAL INVESTMENT, AND
ALLOPARENTAL INVESTMENT EFFECTS ON
CHILDREN'S EDUCATIONAL ATTAINMENT
IN RURAL BANGLADESH

Melissa Dawn Steffan

Dr. Mary K. Shenk, Thesis Supervisor

ABSTRACT

This thesis examines the effects of fathers and alloparents on children's educational attainment. The study site is Matlab, Bangladesh; a small-scale, non-Western, agricultural society with recent market engagement, frequent father absence and alloparental investment. Analyses of data using multiple linear regression analyses are designed to test predictions about how father's residency, father's time spent with children, alloparental investment, and available kin networks influence children's level of educational attainment in number of years of schooling. Results indicate that (1) father absence due to labor migration has a positive effect on children's educational attainment, but father absence due to divorce/abandonment and death has negative effects; (2) direct alloparental investment has a positive effect on children's educational attainment, while having potential alloparents in the household has a negative effect on children's educational attainment; (3) living in father's *bari* (patrilineal family compound) has a positive effect on children's level of educational attainment; and (4) greater amounts of time spent with fathers has a positive effect on oldest sons' educational attainment, but no effect on oldest daughters' educational attainment.

1. Introduction

Father absence and low levels of paternal investment appear to have negative effects on children's educational attainment (Amato & Gilbreth 1999; e.g. Coley 1998; Pong et al. 2003; Jones 2004). Most studies, however, are limited to Western industrial societies where neolocal households predominate and father absence is strongly associated with lower socio-economic status, limited resource access, and/or social stigma. These social contexts represent only the minority of kinship and household systems worldwide, yet among psychologists these findings are widely accepted as universal (Draper & Harpending 1982; Lamb 2004, 2010). In contrast, anthropological research shows cross-cultural variation in the roles that fathers play, the frequency in which they are absent, and the level and type of investment directed towards offspring (Hewlett 1991a; Marlowe 2000). Furthermore, the anthropological studies indicate that alloparents often invest in the offspring of others and help to compensate for father absence and low levels of investment (Hrdy 2005; Flinn & Leone 2006).

The aim of this thesis is to determine the effects of fathers and alloparents on children's level of educational attainment in Matlab, Bangladesh; a small-scale, non-Western, agricultural society with recent market engagement, frequent father absence, and alloparental investment. The anthropological literature on fathers and alloparents from the perspective of human behavioral ecology, and especially theories of parental investment and cooperative breeding, are used to generate predictions about how different types of father absence, father's time spent with children, alloparental investment, and available kin networks influence children's level of educational

attainment in number of years of schooling. Multiple linear regression analyses are used to test predictions that address the following lines of inquiry: (1) How is father absence and paternal investment related to children's level of educational attainment in a society where some types of father absence are normative? (2) How is alloparental investment and the presence of kin living nearby related to children's level of educational attainment?

Paternal investment is often measured in terms of father absence and father presence, which is defined differently throughout the anthropological literature. For the purpose of this thesis I adopt two definitions of father absent households that are used by Draper and Harpending (1982), and categorize them in terms of normative and non-normative father absent societies. The first type of father absence is found mostly among households in the lower socioeconomic groups in stratified and/or technologically advanced societies. In these societies children are aware that they are members of economically depressed groups and recognize that their households are considered inferior in certain domains (Draper & Harpending 1982; McLoyd 1998). I call these "non-normative" father absent societies. The second type of father absence is found in many small-scale and developing populations where it is considered normal and not unusual for fathers to be absent. In these societies marriages may be stable or long-lasting, but it is not expected for fathers to be present or to invest much, if at all, in their offspring. This pattern of paternal investment is more common in pre-state level societies (Draper & Harpending 1982). I call these "normative" father absent societies.

Here I begin with an overview of the psychology literature which examines father absence and low paternal investment effects on children's educational attainment,

followed by a discussion of the limitations of these studies and the assumptions they generate about all fathers, families, and children. I then review the anthropology literature and discuss paternal and alloparental investment, providing examples of cultures where father absence is normative, paternal investment is low, and alloparental investment is common. Next, I describe the social context of father absence in Matlab, Bangladesh, with particular attention to normative father absence due to labor migration. I then integrate what we know from the anthropology literature to generate hypotheses and predictions about children's level of educational attainment in rural Bangladesh. The next sections include the theory, methods, and statistical analyses used to test predictions, followed by a summary of the results and a discussion of what the findings suggest about future research and the importance of fathers and alloparents on children's educational attainment and social development in general.

2. Psychology Literature

Father Absence and Children's Educational Attainment

Academic performance and educational attainment are among the most commonly studied social developmental outcomes of interest to psychologists (Amato & Gilbreth 1999). Recently, a large portion of this research has examined the effect of absent or low investing fathers on children's educational attainment by comparing children living in single-parent households to those living in two-parent nuclear households (Lewis & Lamb 2003). Single-parent households are usually comprised of a mother and her children, often result from divorce, and consequently lead to father

absence and fathers' decreased investment in offspring (Stone 2010; Geary 2005). This has led some psychologists to posit that marital discord is a key contributor to children's low level of educational attainment, versus the absence of a parent and/or their reduced investment (Amato 2006; Amato et al. 1995; Gahler 1998; Cummings et al. 1997).

High levels of father involvement have been shown to significantly predict school achievement and to contribute towards positive school attitudes in children (Flouri et al. 2002; Flouri & Buchanan 2004); cause and effect relationships are not clear from these studies, however. Independent of mother's care, father's care is associated with fewer behavioral problems and better academic achievement in grade-schoolers (Aldous & Mulligan 2002; Coley 1998). Children from father absent homes are more likely to drop out of high school and to score lower on measures of academic achievement than children from father present homes (Hetherington et al. 1983; Astone & McLanahan 1991). Similarly, teenage boys from father absent homes are under-functioning compared to boys from father present homes, and empirical results show positive correlations between high quality father-son relationships and boys' improved grade point average (Jones 2004).

Researchers in other fields, such as sociology and economics, have found similar results. Cooksey and Fondell (1996) analyzed the impact of father's time and family structure on pre-teen and teenagers' educational attainment and found that pre-teens living with both biological parents had higher academic achievement than those living in single-parent households or households with only one biological parent and one step-parent. In a Swedish study, individuals with divorced parents during childhood had significantly lower educational attainment in adulthood (level and field of education

combined with logged annual earnings in adulthood); about one year less of schooling compared to individuals whose parents did not separate during childhood (Bjorklund & Sundstrom 2005). Another study in Sweden found that children with absent fathers had lower educational attainment, were more likely to drop out of school, and had lower academic aspirations than children from father present homes (Murray & Sandqvist 1990). Similarly, sons with divorced parents at age 14 completed, on average, one less year of education than sons from families whose parents were not divorced at age 14 (Couch & Lillard 1997). Australian children with divorced parents also ended their schooling nearly one year earlier than children with married parents (Evans et al. 2001).

Some psychologists are beginning to examine the effects of care provided by people other than biological parents on children's educational attainment, but these studies are not designed to explore investment when fathers are absent and low investing or when investment is complimentary to mother's care. The context for this type of care is also fairly restricted when considering the limited variety of family household structures that exist in Western industrial societies, compared to cross-cultural structures (Van den Berghe 1979). Jaffee et al. (2011) for example, explore educational outcomes when children receive nonmaternal care by the age of 3, but this care could come from relatives or non-relatives and could be provided in the household or in a daycare facility. Although their results show that the placement of children in nonmaternal care by age 3 could be related to family income, these children have significantly higher reading and math achievement scores in childhood and adolescence compared to children not placed in nonmaternal care by age 3. The results do not decipher whether children resided in father present or father absent households.

Some psychologists such as Lang and Zagorsky (2001) have gone beyond comparing children with absent versus present fathers, or children from two-parent versus single-parent households, by exploring the correlates of different types of father absence on children's educational attainment. Although their sample is still limited to subjects from a Western industrial society (and does not address genetic influences passed from fathers to children), Lang & Zagorsky realize that single-parent households are often associated with other socioeconomic disadvantages (at least in Western industrial societies where most of these studies take place). In general, their results show that father absence is statistically significant for lowered education and cognitive ability in children, but that father absence due to death is much less so (Lang & Zagorsky 2001). Amato and Keith (1991) also show in their meta-analysis that father absence due to divorce and incarceration similarly and negatively affect children's educational attainment, but that father absence due to death has little to no effect.

There are dozens of additional empirical studies that show father absence and low levels of investment have negative correlations with children's educational attainment and academic performance (although it appears to have a stronger negative effect on boys than girls (e.g. Biller & Kimpton 1997), but a complete review of this literature goes beyond the scope of this thesis. Furthermore, fewer studies show mixed results, with father absence or low investment having little to no negative influence on children's academic performance and educational attainment. In a meta-analysis by Amato & Keith (1991), for example, father absence due to divorce had a greater negative effect on children's academic achievement than on internalizing behaviors, but an updated meta-analysis showed that father absence negatively affected internalizing behaviors more than

it did academic achievement (Amato 2001). Boggess (1998) also found that teenagers' graduation from high school was not influenced when living in single-mother homes with absent fathers due to death, divorce, and separation, once economic status was controlled for.

Results like those in Boggess's study (1998) have led some psychologists to posit that decreased family income due to the loss of a parent is a more significant predictor of children dropping out of school and having lower educational attainment than is living in a father absent household (e.g. Pong & Ju 2000). Other studies have shown, however, that children's educational attainment worsens with the addition of a step-father after remarriage, which could potentially increase household income (e.g. Hetherington et al. 1989; Boggess 1998). Although the majority of this research finds some negative influence of father absence and low investment on children's educational attainment, the following mixed results suggest that other factors may be responsible for these negative outcomes. These factors may include genetic influences (e.g. inheritance of intelligence from father), cultural stigmas towards father absence, limited resource access in single-mother households, or the limited availability of extended kin to help with childcare in Western industrial contexts.

Aside from the few studies that show mixed results, the majority of the psychology literature shows a significant relationship between single-parent households, father absence, low paternal investment, and children's lowered educational attainment (e.g. Coley 1998; Pong et al. 2003; Jones 2004). What has yet to be asked, however, is whether these outcomes are representative of fathers' influence on normal child development in humans in general, or whether they are a consequence of specific socio-

ecological contexts that are common among father absent families in Western industrial societies. This question is impossible to determine without first conducting research outside of non-normative father absent societies. Moreover, the continued research in non-normative father absent societies, especially predominantly in Western industrial societies, leads to certain assumptions about fathers, families, and children that do not fairly represent all of the world's people.

Limitations and Assumptions of the Psychological Approach

Sigmund Freud may be the first scientist to provide a Western-centric psychoanalytic opinion on fathers and their role in the family. Freud wrote that fathers fill the role of a nurturer (1909) and that they are idealized figures to children (1921). As such, losing a father is one of the most devastating losses that a person could experience (Freud 1900). The assumption that all children should grow up with present, highly investing fathers with deep emotional ties to their children has developed and persists throughout the psychology literature. This has contributed to other claims that children need two parents, that family responsibility should be shared equally between a mother and father, and that children of white middle-class parents are more likely to excel due to better parenting skills (e.g. Palkovitz 2003; Lamb 2004; Lamb 2010). Some psychologists even boldly argue that single-mother households are the result of poor men who are unable to support families or make financial contributions to the household (Wilson 1987). Others argue that mothers choose to be single because it is economically smarter to support a family living off of welfare than by working (e.g. Murray 1984). Assumptions like these are likely to persist if most of this research continues to take place

among subjects in large-scale, Western, industrial societies, which represent only a minority of the diverse social and environmental contexts in which people live (Fouts 2008; Arnett 2008; Henrich et al. 2010).

During much of the 20th century the nuclear family structure, consisting of a husband, wife, and any children, was the primary system of household organization practiced among families living in Western industrial societies (Van den Berghe 1979; Harrell 1997; Stone 2010). Likewise, the extended family household is much less common in Western industrial societies when compared cross-culturally (Van den Berge 1979). Single-parent families, usually headed by mothers, are therefore becoming increasingly common in our own society and underlie the motivation for several psychological studies that address policy concerns over father absence and low paternal investment effects on children's developmental outcomes (e.g. Stone 2010). Single-mother households, however, are often considered inferior family structures to two-parent households and some psychologists view single-mother households as a socially disorganized family structure that is detrimental to children (McLanahan & Booth 1989; Lang & Zagorsky 2001; Amato 1994).

In Western industrial societies single-mother households are associated with lower socio-economic status, limited resource access, and limited childcare support from related kin (McLanahan & Booth 1989; House et al. 1988; McLanahan & Sandefur 1994). Whereas a second parent may be available to provide childcare in a two-parent household, most single-mothers live separate from extended kin due to neolocal residence, a social norm of economic independence of families, and occupational mobility (true for families with higher socioeconomic status) that characterize nuclear

family households in industrial societies (Stone 2010). A single-mother may be in regular contact with friends and family from afar and may be able to manage the stress of raising children alone (Alwin et al. 1985), but this is not likely to provide the types of support or investment that benefit children's educational attainment and other areas of social development.

Fortunately, scientists have recently begun to speculate about Western-centric assumptions that pervade the psychology literature, and "data are accumulating that the relatively recent, normative Euro-American model [of childcare] may be something of a statistical anomaly" (Gottlieb 2009: 116). In *The Neglected 95%*, psychologist Jeffrey Arnett (2008) argues that because Americans produce the vast majority of psychology research Americans are the usual subjects included in these studies, despite representing only 5% of the world's population. In other words, psychologists ignore 95% of the world's people by not conducting research in other areas. Even when research does take place outside of America, psychologists still tend to focus on subjects from Western industrialized nations. Pong et al. (2003) for example, conducted a cross-cultural analysis of children's school achievement in 11 different countries based on whether or not they lived in single-parent versus two-parent households. All 11 countries included in the study were large-scale, Western, and industrial (United States, Scotland, Norway, New Zealand, Netherlands, Ireland, Iceland, England, Canada, Austria, and Australia). Pong et al. (2003) argued that marital discord and limited resource access in single-parent households were possible explanations for the negative correlations that father absence has on children's educational outcomes in the United States and other industrialized countries. Marital discord and limited resource access may certainly be valid and

contributing explanations for lowered educational attainment, but this does not necessarily apply to, nor does it fairly represent children in other socio-ecological contexts, such as those living in normative father absent societies.

Similarly, Henrich et al. (2010) criticize the limited scope of subjects used in behavioral studies that are primarily conducted using university students in WEIRD (White, Educated, Industrialized, Rich, and Democratic) societies. Henrich et al. argue that not only do university students in WEIRD societies misrepresent the majority of the world's population or their behaviors, but findings in these studies are used to generalize about fundamental aspects of normal human behavior and researchers tend to assume that little variation exists across human populations (Sue 1999; Rozin 2006; Arnett 2008; Henrich et al. 2010). Behavioral studies conducted among WEIRD subjects are valid for understanding humans in WEIRD societies, and they remain an important comparative piece for understanding human behavior across various socio-ecological contexts, but further research is needed in other societies before making general claims about all of human behavior. This thesis similarly argues that the negative effects of father absence and low investment on children's educational attainment seen in studies conducted primarily among subjects from WEIRD societies, does not offer a complete picture of 'normal' child development for all humans.

3. Anthropology Literature

Paternal Investment: Influences and Motivations

The anthropological literature shows great cross-cultural variation in the roles that fathers play, the frequency with which they are absent, and the level and type of investment directed towards offspring (Flinn 1981; Flinn & Low 1986; Hewlett 1991a; Marlowe 2000). The fact that many fathers tend to show some level of investment in their offspring, however, makes paternal investment a unique and important feature of human evolution (Geary 2000, 2005; Geary & Flinn 2001; Flinn 2011). As such, it is important to consider that children may have also evolved to adapt differently to different types and levels of paternal investment. In this thesis I adopt and add to Frank Marlowe's (2000) definitions of paternal investment: 1) *direct paternal investment*: a father's direct care of offspring that involves physical contact through carrying or holding, and includes being within the same physical space as children; 2) *indirect paternal investment*: a father's indirect care of offspring, such as food provisioning through subsistence activities, wage earnings, labor or contributed goods, teaching, guarding, arranging marriages, initiating rituals, and anything else that might be considered an indirect benefit to offspring.

Research shows that paternal investment is influenced by various cultural and ecological conditions such as the flexibility of gender roles and the closeness of husband-wife relationships (Hewlett 1987; Hewlett 1991b; Hewlett 2004; Clutton-Brock & Parker 1991; Fouts 2008). Within societies where men control key resources or contribute significantly to their children's diet, for example, men spend much less time directly

investing in offspring than in societies where men control fewer key resources and contribute less to children's diet than females (Goody 1973; Hewlett 1987; Hewlett 1988; Marlowe 2000). For instance, among the horticultural Yanomamo, fathers rarely provide direct investment and it is even rarer for men in polygynous marriages who have control over more resources to provide direct investment in offspring (Hames 1992). Likewise, in foraging societies which are usually egalitarian, men do not control key resources and fathers provide the highest levels of direct investment in offspring compared to pastoralist men who control livestock (Marlowe 2000).

Due to the cross-cultural differences in paternal investment strategies evidenced in the anthropological literature it is important that psychological studies concerning father absence and low investment broaden research interests to include subjects from small-scale, non-industrial, less stratified societies where fathering may take different roles. Hewlett & Macfarlan (2010) point out that research conducted among fathers in stratified societies tends to focus on fathers' economic and care giving roles as opposed to their roles as protectors and educators. This is because class-stratified societies are usually governed by strong nation-states that provide some level of protection to children through military or police force, and provide some education to children through formal institutionalized schooling. In stratified societies fathers are also "living in global economic cash economies" where material wealth and inequality permeates their daily lives (Hewlett & Macfarlan 2010: 414). On the contrary, fathers in hunter-gatherer societies take on different roles and children live in contexts that more closely represent how families have lived for most of human history (Hewlett & Macfarlan 2010). In these and other non-industrial societies, perhaps especially among natural fertility populations,

family planning options and decisions on how to raise children, plus the energetic cost and need for help in childcare are significantly different than in market-economy populations (Kramer 2005).

There are additional factors that influence levels of paternal investment. Low population density and regular husband and wife participation in economic and domestic activities, for example, appear to be associated with greater paternal investment in offspring (Alcorta 1982; Hewlett 1992). High levels of father involvement have also been shown to be associated with nonpatrilocal residence due to limited investment from paternal kin (Katz & Konner 1981). This is not always the case, however, in cultures such as the patrilineal foraging Aka where fathers provide less investment when living matrilocally, where maternal kin are available to help invest (combined with the fact that many new husbands and fathers are occupied with bride-service duties during the first several years of marriage) (Meehan 2005; Fouts 2008). Among the Aka, fathers' care for infants is also influenced by the prevalence of warfare, fertility rates, the extent of male-female cooperation in net-hunting, and the number of brothers a man has (brothers are important in net-hunting groups and they form Aka patrilineal clans) (Hewlett 1991; Hewlett 2004). Winking et al. (2009) also found that Tsimane men adjust their investment in offspring based on the availability of other caretakers. Tsimane fathers invest more when mothers are absent or busy and when there are no older daughters in the household to help care for children (Winking et al. 2009).

Fathers' roles also seem to vary significantly more than mothers' roles cross-culturally and men tend to shift their energies between investing in mating opportunities and investing in parenting (Katz & Konner 1981; Geary 2010). One reason appears to be

because paternal investment it is not always obligatory for offspring survival or for the successful rearing of children from juvenility to adulthood in many populations (Blurton Jones et al. 2000; Sear & Mace 2008). Even within populations, paternal investment varies significantly according to the potential benefits it has on offspring (such as increased survivorship), and is often dependent upon varying degrees of paternity certainty (Flinn 1981; Marlowe 2000; Anderson et al. 2007). Mothers may also manipulate males' concern over paternity certainty to increase their investment in offspring, and sometimes to increase investment from several men (Hrdy 1999; Walker et al. 2010). Winking et al. (2009) tested to see whether Tsimane fathers invested more in mating versus parenting and found that fathers directed efforts towards parenting since their investment was biased to when it had the greatest impact on child-wellbeing. Paternal investment in step-children has also "long been considered mating effort by evolutionists" (Winking 2006:103). Fathers appear to only invest in stepchildren if they are still with the mothers, and fathers tend to spend more time and resources on biological children versus step-children (Flinn 1988; Kaplan et al. 1995; Anderson et al. 1999). Father-child interactions are also reduced if men's ex-wives become involved in new mating relationships, suggesting that investment is aimed towards mating versus parenting (Flinn & Leone 2009).

Similar to the signaling argument made for why men hunt large game, males might also invest in offspring as an honest signal to broadcast their skill as a potential mate, caretaker, or protector to competitors, potential mates, and/or allies (Bird 1999; Hawkes et al. 1997). Among forager men, food provisioning from fathers is often considered investment in mating since they share most of the food they acquire with other

members in the camp. Children of better hunters, however, do tend to eat better and everyone in the camp benefits from the increased meat brought into the camp (Hawkes 1990; Hawkes et al. 2001; Marlowe 2000). Research among Hadza foragers in northern Tanzania also shows that men direct investment efforts towards parenting, but that they tradeoff this investment for mating effort when there is a high probability of increased mating opportunities (Marlowe 1999).

Father Absence and Low Investment

There are many motivations for why men might invest in offspring, but in some cultures fathers are not expected to be involved or present with children during their early developmental stages, if at all. Even in cultures where fathers provide high levels of investment fathers may still be absent at times. Aka fathers for example, provide more direct investment in offspring than fathers in any other society, but fathers may be absent from the household during the first several years of marriage (Hewlett 1991; Fouts 2008). During this time men are usually living matrilocally and are sometimes expected to perform dangerous tasks for their wives' families as a part of their bride-service, such as collecting honey (Fouts 2008). Aka fathers might be absent to avoid risky tasks, because they miss their natal families, or because their families request for their return (Meehan 2005). !Kung fathers also provide high levels of investment to their offspring, but they are often separated from their offspring until the age of 7 (Hewlett 1987).

In some societies fathers are absent from the household because cultural traditions prohibit men and women living together. In New Guinea, Huli men live separately from their wives and daughters and only live with sons once they near puberty and are

considered old enough to join their fathers and other men in male quarters (Hewlett 1987; Glasse 1968). Upon marriage, Huli wives will often move to the parish that their husbands are members of, but they live in separate households with their children or in separate households with their children and mother-in-laws. Huli husbands may live anywhere from a few yards to a few miles away. Upon divorce, it is also Huli fathers—not mothers—who have rights to children, so children of divorced parents are likely to stay in their fathers' parish (Glasse 1965; Glasse 1968).

In other societies women are often considered the heads of households and females form the core of the ideal family structure. This pattern is seen throughout many small-scale Caribbean societies where female kin cooperate in raising children and fathers are absent in more than half of all households (Munroe 2002; Quinlan et al. 2005). Even when men are in relationships and reside in households with children, fathers in Caribbean villages are still likely to spend most of their time in their mothers' or sisters' households and are effectively absent from their wives' households (Munroe 2002). In other contexts, such as in Tonga, fathers may not be absent from the household but their children may be due to the observance and respect of *Mehakitanga* (in this case, the supreme rank of a father's sister), which includes the oldest sister's power to adopt her brother's children (Douaire-Marsaudon 1996).

In other societies fathers may be absent because of polygynous marriages where wives often live in separate households with their children. Among the traditionally pastoral Kipsigis of Kenya, many children live in nuclear households with their mothers, fathers, and sometimes grandparents or young relatives, but fifty-six percent of women in this society are in polygynous marriages (Borgerhoff Mulder & Milton 1985). Children

in these 'single-mother households' live separately from their fathers until puberty (Borgerhoff Mulder & Milton 1985). Perhaps even more interesting is that even when Kipsigi fathers are present in the household, Kipsigi tradition keeps fathers from seeing their children for months after birth and sometimes for the first 4 years of a child's life. This type of father absence is out of fear that infants can be harmed by the strength of a man's gaze or that an infant's dirtiness will jeopardize a man's masculinity (Harkness & Super 1992; Borgerhoff Mulder & Milton 1985).

In societies with matrilineal descent, close husband and wife relationships, or more importantly in this case, a father's close relationship with his children may be discouraged because it threatens to disrupt the strength of the kin group that is bound matrilineally (Stone 2010). Among the matrilineal Nayar of Kerala in southwest India, for example, husbands and wives traditionally lived separately and children had little connection with their fathers (Gough 1955). The Nayar also practiced polyandry and polygyny, and had an arrangement known as "visiting husbands" where husbands lived with their sisters for their entire lives and only visited their wives and stayed the night with them on occasion (Stone 2010: 124). Nayar mothers lived with their brothers and uncles, and it is brothers—not fathers—who exercised authority over her children (Stone 2010).

The matrilineal Khasi of northeast India provide another example of a normative father absent society where mothers' brothers play significant roles that many would consider fatherly duties in a Western context. The Khasi practice a female ultimogeniture, a system of inheritance in which youngest daughters inherit land and property. Matrilocal residence is practiced after marriage, but youngest daughters tend to

remain in their natal households with their mothers, brothers, and children. Elder daughters, however, form separate neolocal households with their husbands and children. Fathers in these households still can assume varying roles from night visitor to head of the household, and can provide different levels of investment that are highly dependent upon his natal family's or his wife's family's need for his labor on the matrilineal property. The children of elder daughters, therefore, are more likely to live in father-present households with mothers and any siblings. On the contrary, children of youngest daughters usually live in father-absent households with their maternal grandmothers and maternal uncles. These absent or peripheral husbands usually devote all of their income and investment to their mothers, sisters, nieces and nephews, not to their wives or biological children (Leonetti et al. 2004; Leonetti et al. 2007).

The preceding are examples of societies where father absence and low paternal investment are normative. In these societies father absence and low investment do not have the same social stigma as they do in non-normative father absent societies which characterize most, if not all populations living in Western industrial societies. Moreover, father absence and decreased investment is not necessarily associated with limited resource access or lowered socio-economic status in non-normative father absent societies where family structures other than the two-parent nuclear household are preferred. Furthermore, because the extended family structure is more commonly practiced in non-Western, non-industrial, small-scale societies, children in these contexts tend to reside with and near large numbers of kin who may buffer any negative effects that father absence or low paternal investment have on children's level of educational attainment or other outcomes (Van den Berghe 1974).

Alloparental Investment and Cooperative Breeding

Just as much of the anthropological literature on father absence and paternal investment focuses on child growth and child mortality outcomes, the same is true regarding alloparental investment (e.g. review by Sear & Mace 2008; Hadley 2004). Sarah Hrdy (2005) has posited that human mothers and children evolved in groups where a variety of individuals other than the father were available to help care for children, enabling women “to produce and rear costlier, slower-maturing offspring than otherwise would survive” (69). Efe children, for example, receive 41% of investment from alloparents and other males spend more time with infants than fathers (Ivy 2000; Morelli & Tronick 1992). Unlike monkeys and apes whose juveniles provision themselves humans have evolved a prolonged stage of childhood reflecting the significance of learning in human adaptation (Bogin 1997, 1998; Alexander 2003; Kramer 2005; Flinn et al. 2007; Hill et al. 2009). Combined with humans’ evolved short birth-intervals and longer lifespan mothers are able to produce children quickly and are likely to have multiple dependents at a given time. Caring for human juveniles, however, involves costly investments that often go beyond the capability (and responsibility) of a sole mother, let alone a mother *and* a father. From the anthropological literature we see that mothers in hunter-gatherer societies often decrease or completely stop foraging efforts while nursing or caring for young infants, necessitating help from other kin to invest in her offspring (e.g. Hurtado et al. 1992; Marlowe 2003; Kramer 2004).

Alloparental investment has been related to many aspects of human life history, such as the evolution of emotions and prosocial behaviors, effective communication, teaching, and accelerating social learning (Hill et al. 2009; Hrdy 2009). Family and

social support networks appear especially important during early childhood, possibly resulting in “evolved developmental mechanisms that detect and internally encode information about levels of supportiveness” (Geary & Flinn 2001; Boyce & Ellis 2005: 292). Furstenberg & Crawford (1978) found that children of teenage mothers who lived with extended kin were more sociable, had fewer behavioral problems, and had higher cognitive scores than children of teenage mothers living alone. Chisholm (1981) also found that Navaho infants interacted more with their mothers when they lived in extended family camps versus nuclear family units. Having a broader network of support, therefore, especially from close kin, may help children to develop the necessary social and developmental skills (Dubow et al. 1991) that are linked with higher levels of educational attainment. Thus, one goal of this thesis is to determine the influence of alloparental investment and the availability of alloparents living nearby on children’s educational attainment.

Other kin often compensate for father absence and low paternal investment, and grandmothers are frequently proposed as alternates to male care (Hawkes 2003; Gibson & Mace 2005; Flinn & Leone 2006, 2009; Sear & Mace 2008). Hadza maternal grandmothers, for instance, hold children more when fathers are absent from the household. Investment from postmenopausal female kin, however, is not always related to the type of investment fathers provide (Hawkes et al. 1997; Marlowe 2000). Among the Khasi, investment from maternal grandmothers significantly benefits the survival and growth of grandchildren (Leonetti et al. 2007). Interestingly, in studies conducted in Western industrial societies children are negatively affected by remarriage and the addition of a step-father to the household (e.g. Daly & Wilson 1988; Hetherington et al.

1989), but this is not the case for the survival of Khasi children after a mother's remarriage (Leonetti et al. 2007). This suggests that alloparental investment and support from matrilineal kin may protect children from potential negative outcomes. If so, then alloparents may also protect against negative effects on other child outcomes, such as lowered educational attainment.

Older dependent children also provide additional opportunities for cooperative breeding and are important producers of family resources and alloparental investment (Kramer 2005). Ifaluk girls, for example, contribute substantial amounts to family subsistence efforts and young mothers whose first children are girls have higher fertility rates due to daughters' indirect investment in siblings (Turke 1988). Kipsigi mothers also begin delegating childcare tasks to older children once their infants reach five months of age, and at three years of age mothers begin to gradually shift all of their investment onto the responsibility of alloparents. This is because children of this age are no longer believed to need much attention from their mothers. Consequently, Kipsigi alloparents are in the proximity of infants more often than mothers and they provide more direct investment to children than mothers. It is also interesting that there are no significant differences in the quality of care (e.g. style and effectiveness in soothing infants) provided by alloparents versus mothers (Borgerhoff Mulder & Milton 1985).

4. Study Population

Matlab, Bangladesh is a rural *upazila* (subdistrict) located four hours by car from the nation's capital, Dhaka. The population in Matlab speaks Bengali and is

predominately Muslim. Kinship is strongly patrilineal and patrilocal residence is commonly practiced after marriage. Fishing and agriculture are the main sources of subsistence, although Matlab residents have increasingly come to rely on cash income earned by adult men, and sometimes teenage boys, who work as day laborers in Matlab or migrant laborers outside of Matlab. In contrast to studies conducted in Western industrial societies where virtually all types of father absence are non-normative and are considered inferior to the nuclear family structure, Matlab provides a good sample population for this thesis because some types of father absence (due to father labor migration and father death) are normative while others are non-normative (father absence due to divorce or abandonment). In addition, many households in Matlab contain a variety of extended kin members and are located within close proximity to households of other kin. In this context, even nuclear households are almost certain to have several kin living within the same *bari* (patrilineal family compound) and there is a greater potential for available alloparents to help increase children's level of educational attainment.

Father absence in Matlab

Most fathers in Matlab are present in the household, but there are several types of father absence common in the region: 1) Many fathers are absent in Matlab due to labor migration, but these fathers usually continue to invest in children in ways that may improve their educational attainment by remaining in contact and emotionally close. They may also send wages home as indirect investment that can improve children's educational attainment by allowing them to continue their education. Father absence due to labor migration is becoming increasingly common, is considered normative, and is not

stigmatized or associated with limited resource access in this population. 2) Fathers are also absent in Matlab due to divorce or abandonment which is not very common, is considered non-normative, and does carry a negative stigma for mothers and children, along with the loss of fathers' income. 3) Fathers are also absent due to death. This type of absence is somewhat normative, though less common more recently, and results in the loss of fathers' income. There is also much less stigma attached to mothers and children when fathers are absent due to death versus absent due to divorce or abandonment (Shenk et al. in press).

A recent article by Shenk et al. (in press) examines the effects of these different types of father absence on the timing of women's age at marriage and age at first birth in Matlab. The authors find that daughters with labor migrant fathers consistently have later ages at marriage and first birth compared to daughters with present fathers. In addition, women with fathers who divorced their mothers or abandoned their families had the earliest ages at marriage and first birth compared to father present women. Father absence due to death, however, actually slowed the speed of women's life histories compared to women with present fathers. The fact that different types of father absence were found to differentially impact the timing of daughters' age at marriage and first birth suggests that different types of father absence may also differentially impact other areas of child development, such as educational attainment.

Female-headed households in Matlab

Research conducted by Joshi (2004) adds to our knowledge about the impacts of family structure on children's school outcomes in Matlab. Joshi (2004) explores the

effects of widows and female heads (whose husbands are usually migrants) on children's schooling. Widows and married women differed in income, ownership, and socio-economic status before marriage. Joshi's (2004) results showed that living in a household headed by a widowed woman did not have a significant effect on children's educational attainment, but children were more likely to attend school, to be currently enrolled in school, and to complete 2 to 3 more years of schooling if they lived in households headed by married women (many of whom had absent husbands due to labor migration). One important factor not taken into account by Joshi is that women, either widows or the wives of labor migrants, often live in the *bari* of their husband's kin or their own natal kin. Thus social support from affinal or consanguineal relatives, and the authority of related men, is likely to be a factor in the lives of many of these women regardless of the absence of their husbands through death or labor migration. Joshi's work does not control for or examine the effects of such support.

Labor Migration and Children's Educational Attainment

Little is known about paternal investment behavior and its impact on children's social outcomes in technologically developing societies (Da Cruz Benetti & Roopnarine 2006). As a result of the increasing influx of the market economy and outsourced labor, however, researchers are beginning to explore the effects of father absence due to labor migration on children's educational attainment in these societies. A recent study in Mexico found that children's school outcomes (in number of completed years of schooling and the highest level of schooling aspired to) were positively correlated with migrant fathers' indirect paternal investment. Mexican fathers are often absent from the

household for multiple years while working in the United States as labor migrants, but a significant proportion of their earnings are sent to families in Mexico; a situation that is becoming increasingly common along with woman-headed households (Nobles 2011). Another study conducted among children in rural South Africa found that children had more years of schooling if they lived with two-parents versus one or no parents, but that having an absent father due to labor migration actually benefited older children's educational attainment, "not through daily contact and supervision but through social connection and financial support" (Townsend et al. 2002: 220). Additional results from this study showed that older children's educational attainment was positively affected by labor migrant fathers when they were living in single-mother households or woman-headed households. It is important to also note that children in rural South Africa often rotate living in the households of different extended kin members in order to meet their care and educational needs, as well as the labor needs of adult kin (Townsend et al. 2002). Finally, a study in Swaziland found no significant differences in the number of years of completed schooling based on whether children had present fathers versus absent fathers due to labor migration (Booth 1996), indicating that father absence due to labor migration had no significant negative effect on children's educational attainment in this society.

5. Hypotheses and Predictions

The main goal of this thesis is to determine whether father absence and low paternal investment negatively affect children's educational attainment in rural

Bangladesh; a non-Western, agricultural, small-scale society where some types of father absence are normative. A secondary aim is to determine whether alloparental investment and/or the availability of alloparents living in the household or nearby benefit children's educational attainment. Effects are measured for the dependent variable children's level of educational attainment in number of years of completed schooling. The analyses are considered in two parts: 1) Children's education is analyzed using predictors for father absence due to labor migration, divorce or abandonment, and death. Also included are predictors for whether children receive direct alloparental investment, live with potential alloparents, or live in *baris* (patrilineal family compounds) where family support networks may benefit their level of educational attainment. 2) Oldest sons and oldest daughters are analyzed separately and are compared across high, medium, and low levels of time spent with fathers growing up (a proxy for direct paternal investment). I present predictions for theories of parental investment and cooperative breeding that have been important in the paternal and alloparental investment literature with regards to childhood outcomes.

Human behavioral ecology brings attention to the importance of ecological variation in determining the consequences of certain behaviors. A basic assumption of human behavioral ecology is that most social behaviors seen in humans have been shaped by natural selection as a result of gene-environment interactions (Winterhalder & Smith 1992; Solomon & Hayes 2009). The result of these interactions is phenotypic plasticity, or the ability to adapt and enhance fitness in response to certain economic, social, and physical constraints of the environment (Boyce & Ellis 2005). In the case of paternal investment effects on children's developmental outcomes, specifically on educational

attainment, children may have evolved to adapt differently to father absence and different types and levels of paternal investment based on the socioecological circumstances they encounter while growing up. The evolutionary theory of socialization is consistent with human behavioral ecology approaches to levels of supportiveness during childhood (Belsky et al. 1991). Belsky et al. (1991) propose that childhood experiences based on the perceived availability and predictability of resources, including direct and indirect investment from parents and alloparents, develop and influence future reproductive strategies. In other words, family support helps to buffer the potential effects of stressful childhood experiences. This thesis does not test the quality of relationships or the quantity of resources transferred to children directly, but it does allow us to test how degrees of stress experienced during childhood (e.g. father absence, marital discord, limited resource access) influence educational outcomes.

Parental Investment Theory

The literature on parental investment theory emphasizes the importance of parental investment levels, including paternal investment, in determining child outcomes. This theory hypothesizes that high levels of investment positively impact child outcomes. Much of this literature focuses on child growth and child mortality (e.g. Gibson 2005; Winking et al. 2011), however, rather than the social developmental outcomes that are of primary interest to psychologists (see exceptions: Gibson & Sear 2010; Scelza 2010; Shenk & Scelza 2012). Under the previous definition of paternal investment, one can include wage earnings sent home to families as indirect investment in offspring. Absent fathers, whose only option is to provide indirect investment while away, may invest in

children in ways that have similar or more positive effects on children's educational attainment than the types of investment present fathers can provide. Given what we know about the different types of father absence in Matlab, we should also expect that father absence due to labor migration will have more positive effects on children's level of educational attainment than other types of father absence because of their continued investment in children. I would like to make the following predictions about children's level of educational attainment in rural Bangladesh:

Prediction 1: Father absence due to labor migration will have a positive effect on child education.

Prediction 2: Father absence due to divorce or abandonment will have a negative effect on child education.

Prediction 3: Father absence due to death will have a negative effect on child education.

Prediction 4: Greater amounts of time spent with fathers will have a positive effect on oldest son's and oldest daughter's education.

Cooperative Breeding Theory

One facet of cooperative breeding theory, often described as a strong reliance on alloparenting or "helping at the nest," is that any investment directed towards non-genetic offspring should increase child survival and reproductive success (Brown 1987; Kramer 2005). W.D. Hamilton (1964) proposed that one benefit of alloparental investment towards non-genetic offspring are the indirect fitness gains that can come from increasing child survival and/or reproductive success (i.e. see Hill & Hurtado 1996). These gains

can include increased mate access, elevated social status, or reciprocal benefits for genetic offspring, among others (Ivey 2000). I assume also that increased fitness can be met through alloparenting efforts that benefit other child outcomes, such as educational attainment. More recently, cooperative breeding has also been related to many aspects of human life history such as the evolution of emotions and prosocial behaviors, effective communication, task specialization, teaching, and accelerated social learning (Hill et al. 2009, Hrdy 2009). If social support networks have significantly positive effects on child development (Fouts 2008), and if cooperative breeding is a critical feature of human evolution that can account for the development of prosocial emotions (Hrdy 2009), then perhaps alloparents can also improve children's schooling outcomes. Because the population in Matlab is strongly patrilineal and patrilocal, matrilineal residence is rare and usually only occurs when women are divorced or widowed, and in need of support from their maternal kin because they are unable to access support from their husband's kin. Children in rural Bangladesh living in their father's *bari*, therefore, should have greater kin support levels than children living in their mother's *bari* or outside of either parent's *bari*. I would thus like to make the following predictions about children's level of educational attainment in rural Bangladesh:

Prediction 1: The direct involvement of an alloparent in raising or caring for a child will have a positive effect on that child's education.

Prediction 2: Children living in their father's *bari* (a proxy for greater kin and resource support) will have higher levels of educational attainment than children living outside of their father's *bari*.

Prediction 3: Children living with potential alloparents in the household will have higher levels of educational attainment than children without potential alloparents in the household.

6. Methods

Sample

The results reported in this thesis are drawn from data collected by Dr. Mary K. Shenk and her collaborators at the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) in Matlab from March 2010 to August 2010. Since the late 1960s ICDDR,B has collected demographic records on individuals in Matlab to facilitate research and public health services in the area. ICDDR,B's existing list of all women in the population allowed for a random sample that was stratified and evenly distributed across three age categories (20-34, 35-49, and 50-64) in order to adjust for rapid population growth. A detailed survey was then administered to 944 women respondents aged 20-64. Children of these women respondents serve as the sample population in this study.

Detailed surveys included information on children's schooling, parents' age and education, occupation, household demographics, income, residency, and alloparents. Surveys were administered as interviews in the respondents' native language, Bengali, and took about 1 hour each to complete.

There are 2,953 children in the dataset, but the sample for the analysis of all children included 2,480 individuals for whom data existed on all variables used in these

analyses. Children not included in the sample have similar years of educational attainment as children in sample, and were simply excluded because data did not exist on one or more of the predictor/control variables. Out of the total sample for oldest sons (N = 707) and oldest daughters (N = 709) there were only 407 oldest sons and 405 oldest daughters for whom data existed on all variables, including both their level of educational attainment, the amount of time fathers spent with them growing up, and several control variables.

Father Absence Categories

Children of survey respondents (also referred to as mothers) were stratified based on whether their fathers were present or absent in the household due to labor migration, divorce or abandonment, and death. The father absence categories were taken from Shenk et al. (in press), but since the fathers are different in the two papers (i.e. respondent's fathers were examined in the Shenk et al. paper while respondent's husbands are examined in this thesis) the father absence variables were created separately. For this thesis, father absence status was determined using two variables. One variable asked respondents about their marital status, in which women could answer that they are married with present husbands, married with husbands working outside of Matlab, married with husband having left, divorced, or widowed. The other variable used regards the amount of time respondents' husbands spent with their oldest son and oldest daughter growing up. If her response indicated that her husband had 'constant contact most of the day' to contact 'a few days per week' the respondent's child was coded as 'father present.' If the response indicated that the her child saw his/her father 'a

few days per month,' 'a few times per year,' or 'rarely' the child was coded in one of three possible ways: if the respondent's husband was a labor migrant, the child was coded as 'father absent – labor migrant'; if there was no indication of labor migration and the respondent indicated 'a few times per month' the child was coded as 'father present'; if there was no indication of labor migration or father death and she indicated 'a few times per year' or 'rarely' the child was coded as 'father absent – divorce/abandonment.' Finally, if the respondent indicated that her child saw its father 'never, he was absent' the child was coded as 'father absent – divorce/abandonment', while if the respondent indicated that her child saw its father 'never, he was dead', the child was coded as 'father absent – dead.' In most cases the marital status variable gave the father's presence or absence category directly, and the time spent with children was used to confirm this. If the two variables differed, however, time spent with children was given precedence for children of older mothers whose husband status was likely to have changed since the time their children were young. Contextual information from other parts of the survey indicating a father's labor migration, divorce, or death was used to confirm these categorizations in all cases for which such data existed.

As shown in Table 1, of the 2,480 children in the sample, 1,878 children had present fathers, 508 had fathers absent due to labor migration, 34 had fathers absent due to divorce from their mothers or abandonment of the family, and 60 had fathers absent due to death.

Paternal Investment Categories

Oldest sons and oldest daughters of respondents were stratified based on a measurement of how much time fathers spent with them growing up, a proxy for direct paternal investment. Using this variable, children were categorized based on whether their fathers spent a lot of time (high level of investment), a moderate amount of time (medium level of investment), or little to no time (low level of investment) with them growing up. Paternal investment was determined using a variable for the amount of time fathers spent with oldest sons and oldest daughters (a) between ages 5-11, and (b) from age 12 to marriage. The maximum level of paternal investment was taken from the two time periods. Respondents were asked how much time their husbands spent with their oldest son and oldest daughter and were given the following scale of answers to choose from: 1) constant contact most of the day, 2) about half of the day, 3) a few hours per day, 4) a few days per week, 5) a few days per month, 6) a few times per year, 7) rarely, 8) never, he was absent, or 9) never, he was dead. If respondents answered that husbands were in constant contact most of the day, about half of the day, or a few hours per day this was coded as 'high levels of paternal investment.' These categories were lumped into high investment because they each included contact between fathers and children on a daily basis. If respondents answered that husbands spent a few days per week or a few days per month with oldest sons or oldest daughters this was coded as 'medium levels of paternal investment.' These categories were lumped into medium investment because the amount of time fathers spent with children was not on a daily basis (high investment), nor was it inconsistent or minimal. Finally, if respondents answered that husbands spent a

few times per year, rarely spent time, never spent time because he was absent, or never spent time because he was dead this was coded as ‘low levels of paternal investment.’

As shown in Table 2, the majority of oldest sons in the sample (N = 316) had fathers who provided them high levels of investment. Of the remaining oldest sons, 48 had fathers who provided medium levels of investment, while 43 had fathers who provided low levels of investment. The majority of oldest daughters in the sample (N = 318) also had fathers who provided them high levels of investment, while 49 had fathers who provided medium levels, and 38 had fathers who provided low levels of investment.

Alloparental Investment Categories

1. *Direct Alloparental Investment.* Direct alloparental investment was determined based on whether respondents answered that someone other than themselves or their husbands had helped to raise the child; they were also asked who that person was and how much time they spent with the child. From this data a dummy variable was created with 0 = no alloparent and 1 = had alloparent. Out of the total sample in which data existed for all variables used in the regression analyses, 79 total children, including 10 oldest sons, and 11 oldest daughters received direct alloparental investment from someone other than their mother or their father. This is thus a very direct measure of alloparental care as it measures when someone was directly involved in raising the child rather than simple proximity or presence in the household. Direct alloparenting occurred about ¼ of the time in the absence of fathers (N = 21).

2. *Potential Alloparent(s) in the Household.* The dummy variable for whether children had any potential alloparents living in the household was created by combining

survey questions that asked respondents (mothers) who was living in the household. Siblings and young children were not included, as it is uncertain whether they were old enough to potentially provide alloparental investment. Anyone older than or in the same generation as the respondent (child's mother) or her husband (child's father) were included as potential alloparents. Specifically, children with one or more of the following individuals in the household were assigned "1" while those without were given "0": aunts, uncles, grandparents, aunts-in-law, uncles-in-law, any other relatives of an older generation, and servants. Out of the total sample in which data existed for all variables, 414 total children, including 100 oldest sons, and 101 oldest daughters lived with potential alloparents in the household.

3. *Bari (Patrilineal Family Compound) Residence.* *Bari* residence was determined based on whether respondents answered that they were living in their father's *bari* (natal *bari*), husband's *bari* (marital *bari*), father and husband's *bari* (if these were the same *bari*), outside of either *bari*, or other. Whether children lived in their 'fathers' *bari*' was determined if respondents answered that they lived in their husband's *bari* or in their husbands' and father's *bari* (same *bari*). Children living in their 'mothers' *bari*' were determined if respondents answered that they lived in their fathers' *bari*. Children living somewhere other than their mothers' or fathers' *bari* were labeled 'other *bari*' and determined if respondents answered that they lived anywhere outside of their fathers' or husbands' *bari*.

The majority of children (N = 2,312), including oldest sons (N = 376), and oldest daughters (N = 377) lived in their father's *bari* or in rare cases in a *bari* with both their father's and mother's families. 54 children, 12 oldest sons, and 9 oldest daughters lived

in their mother's *bari* while 114 children, 19 oldest sons, and 19 oldest daughters lived outside of either *bari*. While there are diverse reasons for residence in the mother's *bari*, in many cases it occurs due to widowhood, divorce, or desertion. It may also occur due to a husband's disability or a falling out with relatives. In general, residence in the mother's *bari* or outside a *bari* is associated with reduced resource access and support from kin, especially the mother's affinal kin.

Outcome Variable

Children's level of educational attainment is the only outcome variable used in this thesis. Educational attainment was determined based on the answers mothers (respondents) gave during the interview. Respondents were asked to give the maximum number of years of schooling that each child had completed. The total number was recorded and serves as the measure for each child's level of educational attainment.

Control Variables

Several control variables were included in the regression analyses. Child characteristics that were controlled for included age, sex, whether the child was still in school, birth order, and number of siblings. Family characteristics that were controlled for included mother's age, mother's education, father's age, father's education, annual household income (logged), and the number of people in the household. The analysis for oldest sons and oldest daughters also included kin support characteristics as control variables (father's *bari*, direct alloparental investment, potential alloparent(s) in the

household) since the sample size did not allow for interpretation of these variables. Kin support characteristics were used as predictor variables in the analysis of all children.

Annual household income was recorded in Bangladeshi Taka (BDT) in 2010 during data collection. The mean annual household income for all children in the sample (N = 2480) was 70,162.41 Taka, roughly equal to \$1,007.36 United States Dollars (USD) based on the currency exchange rate of 69.65 BDT per 1 USD in July 2010. The Gross national income for Bangladesh was estimated at \$770 USD per capita in 2011 (The World Bank). Annual income in Matlab appears higher than the national income because the variable used included income for both the husband and wife.

Analytical Methods

The goal of this paper is to determine whether father absence and lower levels of paternal investment negatively affect children's educational attainment in rural Bangladesh; a small-scale, non-Western, agricultural society with some forms of normative father absence. A secondary aim is to determine whether alloparental investment and the availability of extended kin networks living in the household or nearby benefit children's educational attainment. All analyses were performed in SPSS.

Summary statistics were run for all variables used in the analyses for all children (Table 1), and in the analyses for oldest sons and oldest daughters (Tables 2 and 3). Multiple linear regression was used to determine if level of educational attainment differed significantly between children who had present fathers or absent fathers due to different reasons, or who had different experiences of alloparental support and residence. The same technique was used to determine whether level of educational attainment

differed significantly for oldest sons and oldest daughters whose fathers spent different amounts of time with them growing up. Boxplots were made for all children's educational attainment according to the father present and father absence categories, direct alloparental investment, and *bari* residence (Figures 3, 4, and 5). Boxplots were also made for oldest sons' and oldest daughters' educational attainment according to the amount of time (level of investment) spent with fathers during childhood (Figures 6 and 7).

Both sets of analyses, on all children and on oldest sons and oldest daughters, control for whether children were still enrolled in school since some children may continue their education further than the number of years of completed schooling reported by respondents (mothers). Both sets of analyses also control for child's age and number of siblings since older children typically have more years of schooling, and because having more or fewer siblings can determine opportunities for schooling. The analysis of all children also controls for child sex and birth order to address the possibility that parents might favor a certain sex or earlier or later-born children in terms of schooling. Mother's education and age, and father's education are also controlled for in the analysis with all children since this is expected to influence children's educational outcomes. Father's age is controlled for in the analysis on oldest sons/oldest daughters because it provides an important adjust for the main predictor time spent with children, though including this variable results in substantial loss of sample size.

Robustness checks were implemented to see whether the results matched the overall analyses. Identical analyses were run on children 18 and under, then again on children 19 and older to make sure that results were not being skewed by including some

children who had not yet completed schooling. While the results were not identical to the full sample (i.e. the levels of significance changed as a result of small sample size for a few of the dummy variables), no problematic patterns emerged thus final analyses were run on the entire sample of children, including both those finished with school and those still in school. All analyses included controls for child age and a dummy indicating whether the child was still in school to adjust for these factors. Multicollinearity checks (VIF and Tolerance) were run on all models to identify any collinear variables. The only concern raised by these checks was that respondent's age and husband's age could not be used in the same model. Thus all models contain one or the other, as was thought to be most appropriate for that particular analysis.

A final point should be made regarding causality versus correlation between the predictor and outcome variables. Correlated data were collected in the survey, but because the data are not longitudinal and some of the events are currently occurring this research is limited to what can be said about causality. For example, some children in the model are still in school and may continue their schooling for an unknown period of time. This is controlled for in the model, but positing a causal relationship between the effects of the predictor variable and the result of the outcome variable is not possible, nor is it attempted or implied in this thesis. For older children whose father absence status is known from children and who have completed school, the causal inference is stronger, but as the data were collected retrospectively rather than prospectively this is still limited.

7. Results

Summary Statistics

A histogram of children's educational attainment in years of completed schooling can be found in Figure 1. Most children in the sample complete schooling with 5 and 9 or 10 years of education, which one would expect at the end of primary school (5th grade) and the end of secondary school (10th grade; those with 9 years were likely unable to pass the SSC exams at the end of 10th grade). Out of the total sample (N = 2480) the mean for educational attainment is 6.54 years of schooling with a standard deviation of 3.59. In terms of gender and birth order, first born sons attain higher levels of educational attainment (mean = 7.16 years of completed schooling) compared to later born sons (mean = 6.55 years of completed schooling). First born daughters, however, attain lower levels of education (mean = 6.05 years of completed schooling) compared to daughters who were born later (mean = 6.47 years of completed schooling).

A histogram of educational attainment (in years of completed schooling) for children finished with school can be found in Figure 2. Similar to all children in the sample (Figure 1), most children who finished school completed 5 and 9 years of schooling. More children who are finished with school, however, appear to have never attended school at all (0 years of education), likely because this part of the sample contains children who are currently older. Out of this sample (N = 1659) the mean for educational attainment is 6.94 years of schooling with a standard deviation of 3.49.

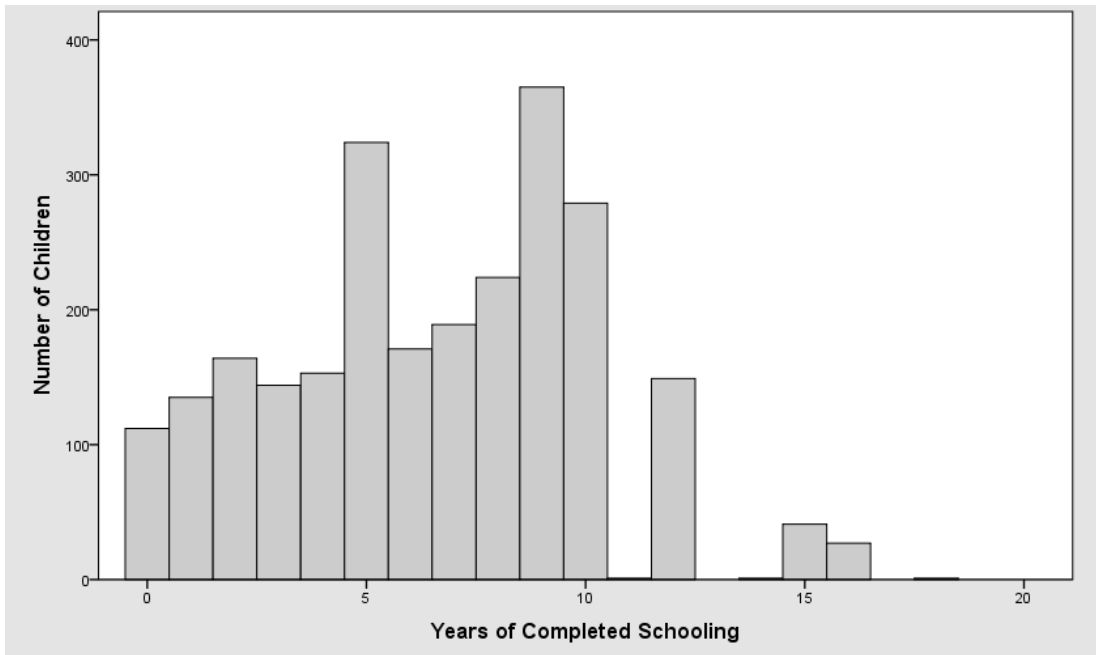


Figure 1. Histogram of Educational Attainment for All Children.

This figure shows how many children attained different levels of education (in years of completed schooling).

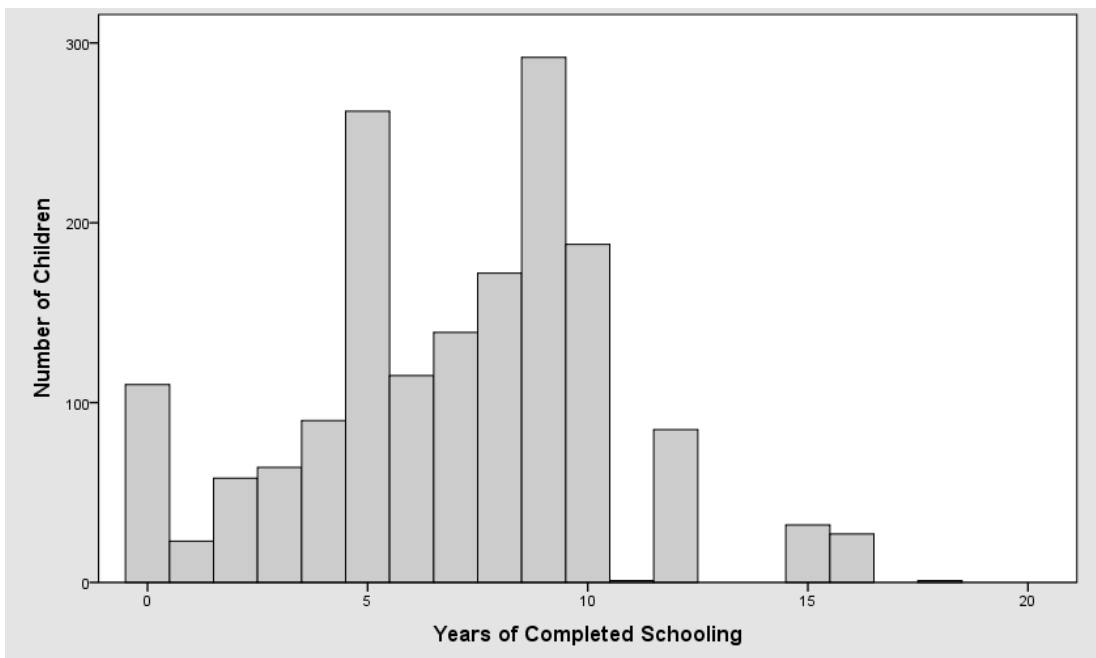


Figure 2. Histogram of Educational Attainment for Children Finished With School

This figure shows how many children attained different levels of education (in years of completed schooling), but the sample is only limited to the children who have completed school and excludes all children currently in school.

Table 1 presents basic summary statistics for all variables used in the regression analysis for all children. The categories include the outcome variable, child characteristics, family characteristics, father status categories, and kin support variables. On average, children in the sample received 6.54 years of schooling.

Tables 2 and 3 present basic summary statistics for all variables used in the regression analysis for oldest sons and oldest daughters. These categories include the outcome variable, oldest sons'/oldest daughters' characteristics, family characteristics, time spent with father categories, and kin support variables. Oldest sons received 6.68 years of schooling on average, while oldest daughters received 5.66 years of schooling on average.

Table 1. Summary Statistics for All Children. Summary statistics show the sample size, mean, and standard deviation for all children in the sample.

Variable Category Variable Name	N	Mean or %	Standard Deviation
Outcome Variable			
Completed Years of Schooling	2480	6.54	3.59
Child Characteristics			
Age	2480	23.62	9.68
Sex (dummy, female = 1)	1170 of 2480	47%	0.50
Still in School (dummy, yes = 1)	821 of 2480	33%	N/A
Birth Order	2480	2.74	1.61
Number of Siblings	2480	4.54	1.62
Family Characteristics			
Mother's Age	2480	48.80	9.13
Mother's Education	2480	2.56	3.09
Father's Education	2480	4.28	4.27
Annual Household Income (logged) ¹	2480	10.20	2.43
Number of People in Household	2480	5.32	2.43
Father Status Categories			
Present (dummy)	1878 of 2480	76%	N/A
Absent – Labor Migration (dummy)	508 of 2480	20%	N/A
Absent – Divorce/Abandonment (dummy)	34 of 2480	1%	N/A
Absent – Death (dummy)	60 of 2480	2%	N/A
Kin Support Variables			
Direct Alloparental Investment (dummy)	79 of 2480	3%	N/A
Father's <i>Bari</i> (dummy)	2312 of 2480	93%	N/A
Mother's <i>Bari</i> (dummy)	54 of 2480	2%	N/A
Other/Outside <i>Bari</i> (dummy)	114 of 2480	5%	N/A
Potential Alloparent(s) in Household (dummy)	414 of 2480	17%	N/A

¹ Annual income was recorded in Bangladeshi Taka in 2010.

Table 2. Summary Statistics for Oldest Sons. Summary statistics show the sample size, mean, and standard deviation for oldest sons in the sample.

Variable Category Variable Name	N	Mean or %	Standard Deviation
Outcome Variable			
Completed Years of Schooling	407	6.68	4.08
Oldest Sons' Characteristics			
Age	407	22.89	10.57
Still in School (dummy, yes = 1)	123 of 407	30%	N/A
Number of Siblings	407	3.81	1.51
Family Characteristics			
Mother's Education	407	3.31	3.45
Father's Education	407	4.65	4.33
Father's Age	407	54.39	11.73
Annual Household Income (logged) ¹	407	10.33	2.47
Number of People in Household	407	5.29	2.31
Time Spent With Father Categories			
High Investment (dummy)	316 of 407	78%	N/A
Medium Investment (dummy)	48 of 407	12%	N/A
Low Investment (dummy)	43 of 407	11%	N/A
Kin Support Variables			
Direct Alloparental Investment (dummy)	10 of 407	2%	N/A
Father's <i>Bari</i> (dummy)	376 of 407	92%	N/A
Mother's <i>Bari</i> (dummy)	12 of 407	3%	N/A
Other/Outside <i>Bari</i> (dummy)	19 of 407	5%	N/A
Potential Alloparent(s) in Household (dummy)	100 of 407	25%	N/A

¹ Annual income was recorded in Bangladeshi Taka in 2010.

Table 3. Summary Statistics for Oldest Daughters. Summary statistics show the sample size, mean, and standard deviation for oldest daughters in the sample.

Variable Category Variable Name	N	Mean or %	Standard Deviation
Outcome Variable			
Completed Years of Schooling	405	5.66	3.60
Oldest Daughters' Characteristics			
Age	405	21.84	10.63
Still in School (dummy, yes = 1)	134 of 405	33%	N/A
Number of Siblings	405	3.83	1.50
Family Characteristics			
Mother's Education	405	3.49	3.59
Father's Education	405	4.52	4.35
Father's Age	405	53.70	12.02
Annual Household Income (logged) ¹	405	10.32	2.46
Number of People in Household	405	5.30	2.24
Time Spent With Father Categories			
High Investment (dummy)	318 of 405	79%	N/A
Medium Investment (dummy)	49 of 405	12%	N/A
Low Investment (dummy)	38 of 405	9%	N/A
Kin Support Variables			
Direct Alloparental Investment (dummy)	11 of 405	3%	N/A
Father's <i>Bari</i> (dummy)	377 of 405	93%	N/A
Mother's <i>Bari</i> (dummy)	9 of 405	2%	N/A
Other/Outside <i>Bari</i> (dummy)	19 of 405	5%	N/A
Potential Alloparent(s) in Household (dummy)	101 of 405	25%	N/A

¹ Annual income was recorded in Bangladeshi Taka in 2010.

Father Absence and Children's Level of Educational Attainment

Figure 3 shows boxplots of all children's highest level of educational attainment according to father presence and three types of father absence. The median is indicated by a line in the center of each plot while the edges of the box represent the 25th and 75th percentiles, and the whiskers represent the 5th and 95th percentiles. Significance is not tested between the boxplots/categories, but significance is addressed in the regression results. The boxplots clearly show that having an absent father due to labor migration is just as beneficial for children's educational attainment as having a present father. In contrast, children with absent fathers due to divorce/abandonment have the lowest median level of educational attainment. Children with absent fathers due to death also have lower educational attainment, but they complete more years of schooling overall compared to children with absent fathers due to divorce or abandonment. Figures 3, 4, and 5 are adjusted for the same variables used in the linear regression (below), but a boxplot of the raw data looks quite similar.

Figures 4 and 5 show boxplots for all children's highest level of educational attainment according to different proxy measures of kin support, including direct alloparental investment and *bari* residence. Figure 4 shows a similar median level of educational attainment for both children who did and did not receive direct alloparental investment, although the majority of children with alloparents completed more years of schooling than children without alloparents. Figure 5 shows that children living in their father's *bari* have a higher median level of educational attainment than children residing in their mother's *bari*, outside a *bari*, or in some other *bari*.

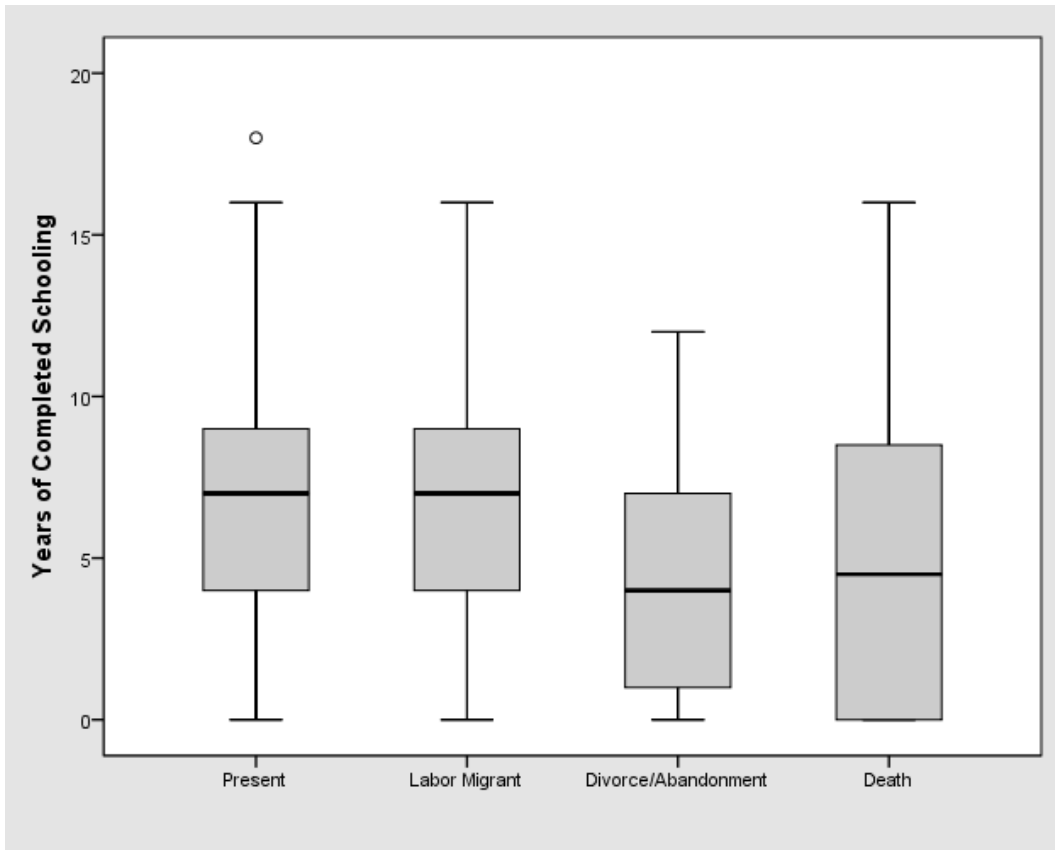


Figure 3. Boxplot for Children’s Educational Attainment by Type of Father Absence

This figure shows level of educational attainment (in years of completed schooling) for children with different father absence statuses after adjustment for key child characteristics (age, sex, if still in school, birth order, number of siblings), family characteristics (mother’s age and education, father’s education, logged annual household income, number of people in the house), and kin support characteristics (direct alloparental care, *bari* residence, and potential alloparents in the household).

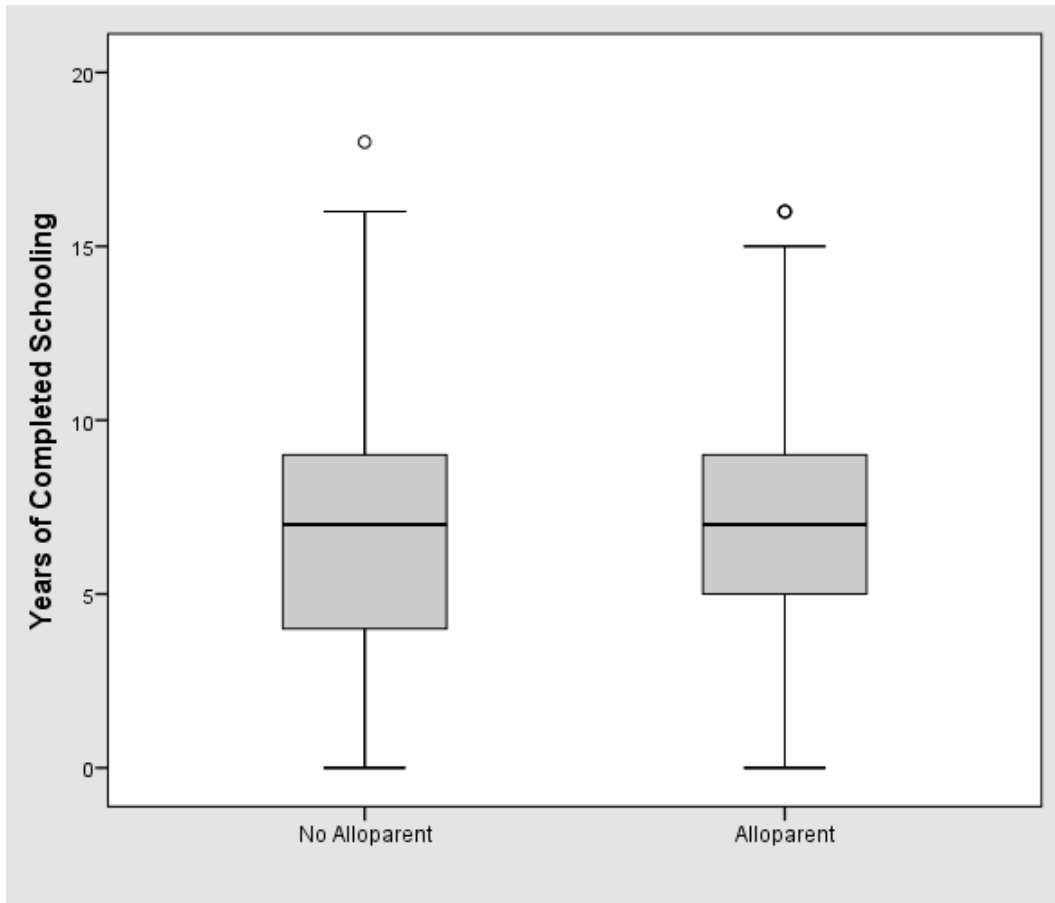


Figure 4. Boxplot for Children’s Educational Attainment by Direct Alloparental Investment

This figure shows level of educational attainment (in years of completed schooling) for children who did and did not receive direct alloparental investment after adjustment for key child characteristics (age, sex, if still in school, birth order, number of siblings), family characteristics (mother’s age and education, father’s education, logged annual household income, number of people in the house), type of father absence (present, labor migrant, dead, divorced/deserted), and kin support characteristics (*bari* residence, and potential alloparent(s) in the household).

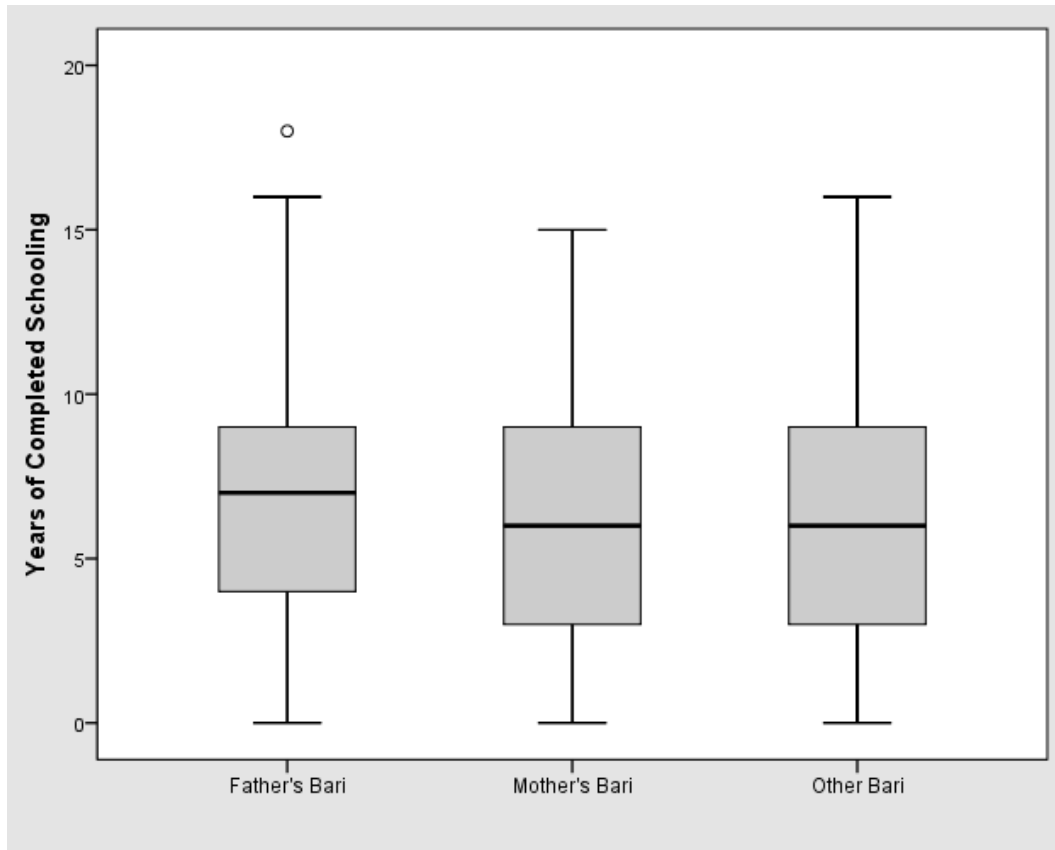


Figure 5. Boxplot for Children's Educational Attainment by Bari Residence

This figure shows level of educational attainment (in years of completed schooling) for children who lived in different types of *baris* (family compounds) after adjustment for key child characteristics (age, sex, if still in school, birth order, number of siblings), family characteristics (mother's age and education, father's education, logged annual household income, number of people in the house), type of father absence (present, labor migrant, dead, divorced/deserted), and kin support characteristics (direct alloparental investment and potential alloparent(s) in the household).

The results of a multiple linear regression for the effects of types of father absence and different types of alloparenting on children's level of educational attainment are shown in Table 4. The unstandardized beta coefficients can be interpreted as an increase (no negative sign) or a decrease (negative sign) in educational attainment (in number of years of completed schooling) in relation to the variables listed. For each increase of 1

unit in the predictor or control variable, the beta coefficient shows how much of an increase/decrease there will be in years of education. Significant and positive predictors include child's age, if the child is still in school, birth order, mother's age, mother's education, father's education, and household income (logged). Significant and negative predictors include child's sex (1 = female) and number of people in the household. Number of siblings is also controlled for in the analysis and has a slightly negative effect but it is not a significant predictor of children's educational attainment when the number of people in the household is included in the model. In terms of father absence, father absence due to labor migration has a significant positive effect on children's educational attainment compared to children with present fathers (the reference category). Children with labor migrant fathers have slightly higher levels of educational attainment (0.3 years more of schooling) than children with present fathers, with significance at the .10 level. The results for children with labor migrant fathers is less significant when the total number of people in the household is controlled for (a significant and negative effect), suggesting the potential for individuals in the household to compete over resources (i.e. earned income sent to families in Matlab by labor migrant fathers). Children with absent fathers due to divorce/abandonment or death, however, have significantly lower levels of educational attainment (over 2 years less schooling) than children with present fathers. As predicted, children with labor migrant fathers are more likely to have higher educational attainment due to father's increased income. Father absence due to labor migration is also normative in rural Bangladesh and does not carry the stigma that father absence due to divorce or abandonment does in this population. It is not surprising then, that the non-normative type of father absence (divorce/abandonment) has a significant

negative effect on children's level of educational attainment while the normative type of father absence (labor migration) has a positive effect. Father absence due to death is somewhat normative in rural Bangladesh, but it also has a significant negative effect on children's educational attainment compared to children with present fathers. This is likely due to the loss of a father's investment and financial contribution to the household since father absence due to death does not entail the same kind of stigma that father absence due to divorce or abandonment does.

The effects of different measures of alloparental investment on children's level of educational attainment are shown in the regression analysis in Table 4. The results show that living in father's *bari* is associated with a significant increase in children's level of educational attainment by half a year, compared to living in mother's *bari* or outside of either *bari* (the reference categories). As predicted in this patrilineal/patrilocal society, father's *bari* has a positive effect on children's educational attainment and serves as a proxy for greater levels of support through increased kin investment and greater resource access through paternal relatives. This is compared to children living in mother's *bari*, and children living outside of either *bari* where there are fewer kin networks and less access to resources—children living outside of the father's *bari* are living in a non-normative situation sometimes associated with a loss of support from paternal kin.

Results also show that having direct alloparental investment from a related individual is correlated with a significant increase in children's level of educational attainment by 0.74 years. Interestingly, however, simply having potential alloparents in the household (adults of either gender (as shown) or just adult women (not shown)) has a significantly *negative* effect on children's schooling of 0.31 years. This is in addition to

the general negative effect of the total number of people in the household. These results suggest that direct alloparental investment does improve children's educational attainment, but that potential alloparents living in the household are more likely to compete over resources rather than improve child outcomes. This result also stands in contrast to the positive effect of having kin support networks outside of the household (i.e. in the *bari*) where kin appear not to be in competition over resources and are thus more available to provide support that benefits children's educational attainment. This is consistent with the fact that direct resource sharing occurs much more intensively within the household than outside of it.

Table 4. Regression Results for All Children. Regression results show the effects of covariates on the outcome variable years of educational attainment for all children in the sample (N = 2480).

Educational Attainment for All Children	
Variable Category Variable Name	Unstandardized Beta Coefficient (Standard Error) ¹
Child Characteristics	
Age	0.105 (0.01)***
Sex (dummy, female = 1)	- 0.319 (0.13)**
Still in School (dummy, yes = 1)	0.480 (0.20)**
Birth Order	0.122 (0.06)*
Number of Siblings	- 0.081 (0.06)
Family Characteristics	
Mother's Age	0.067 (0.02)***
Mother's Education	0.077 (0.03)**
Father's Education	0.199 (0.02)***
Annual Household Income (logged) ²	0.061 (0.03)*
Number of People in Household	- 0.064 (0.03)*
Father Absence Status	
Labor Migration (dummy)	0.264 (0.17)†
Divorce/Abandonment (dummy)	- 2.107 (0.57)***
Death (dummy)	- 2.446 (0.43)***
Kin Support Characteristics	
Reside in Father's <i>Bari</i> ³ (dummy)	0.563 (0.27)*
Direct Allopaparental Investment (dummy)	0.735 (0.37)*
Potential Allopaparent(s) in Household (dummy)	- 0.314 (0.19)†

¹ Statistical significance is represented as follows: *** p < .001; ** p < .01; * p < .05; † < .10

² Annual income was recorded in Bangladeshi Taka in 2010.

³ Father's *bari* includes the rare situations in which the mother's and father's natal *bari* is the same.

Paternal Investment and Oldest Sons'/Oldest Daughters' Levels of Educational Attainment

Figures 6 and 7 show boxplots for the level of educational attainment of oldest sons and oldest daughters, respectively, based on the amount of time fathers spent with them growing up. The median is indicated by a line in the center of each plot while the edges of the box represent the 25th and 75th percentiles, and the whiskers represent the 5th and 95th percentiles. Significance is not tested between the boxplots/categories, but significance is addressed in the regression results. Figure 6 clearly shows that oldest sons benefit from high and medium amounts of time spent with fathers compared to oldest sons whose fathers spent little to no time with them (low investment). Oldest sons who spent a lot of time with fathers (high investment) have the highest maximum years of completed schooling overall, but oldest sons who spent a moderate amount of time with fathers (medium investment) have the highest median level in number of years of completed schooling. Oldest daughters, however, seem to be less affected by the amount of time fathers spent with them growing up (Figure 7). The number of years of completed schooling for the majority of oldest daughters who spent a lot of time (high investment) or a moderate amount of time (medium investment) with fathers are similar. Medium levels of investment also appear to benefit oldest daughters more than high levels of paternal investment, at least when the plot between the 25th and 75th percentiles are compared. The majority of oldest daughters (between the 25th and 75th percentiles) who spent little to no time with fathers (low investment) have an identical range in number of years of completed schooling compared to oldest daughters with high investing fathers, but the median level clearly shows that daughters with low investing

fathers have the least number of years of completed schooling compared to both medium and high levels of investment.

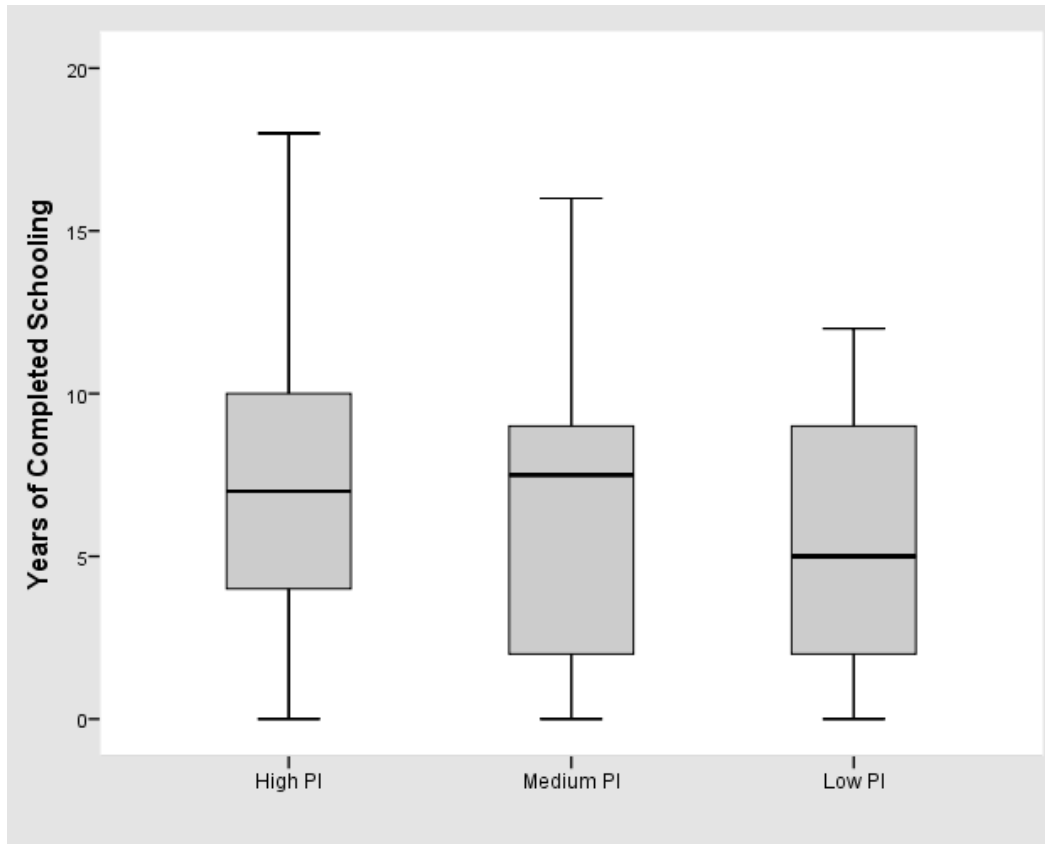


Figure 6. Boxplot for Oldest Sons' Educational Attainment by Time Spent With Father. This figure shows level of educational attainment (in years of completed schooling) for the amount of time fathers spent with oldest sons after adjustment for key son characteristics (age, if still in school, number of siblings), family characteristics (mother's education, father's age and education, logged annual household income, number of people in the house), and kin support characteristics (direct alloparental care, *bari* residence, and potential alloparent(s) in the household).

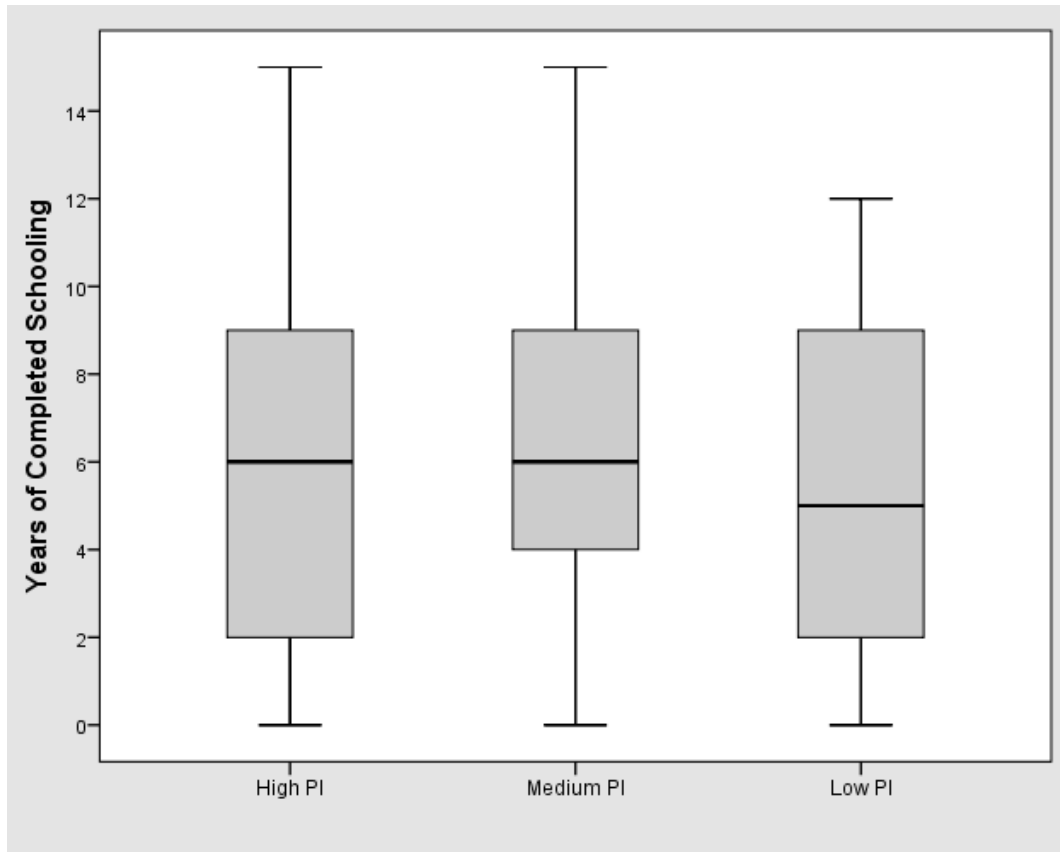


Figure 7. Boxplot for Oldest Daughters' Educational Attainment by Time Spent With Father. This figure shows level of educational attainment (in years of completed schooling) for the amount of time fathers spent with oldest daughters after adjustment for key daughter characteristics (age, if still in school, number of siblings), family characteristics (mother's education, father's age and education, logged annual household income, number of people in the house), and kin support characteristics (direct alloparental care, *bari* residence, and potential alloparent(s) in the household).

The results of a multiple linear regression for the effects of time spent with fathers on oldest sons' and oldest daughters' level of educational attainment are shown in Tables 5 and 6. Significant and positive predictors for oldest sons include son's age, mother's education, and father's education. For oldest daughters, significant and positive predictors included daughter's age, father's education, and annual household income. Significant and negative predictors for oldest sons included father's age, number of people in the household, and whether the child was still in school. For oldest daughters,

significant and negative predictors included number of siblings and whether the child was still in school.

In terms of time spent with fathers, medium and high levels of investment appear to have significant positive effects on oldest sons' educational attainment but not on oldest daughters' educational attainment. Fathers who provided medium and high levels of investment had significant and positive effects on oldest sons' educational attainment compared to oldest sons with fathers who provided low levels of investment (the reference category) at the .10 level. Oldest daughters' educational attainment, however, was not significantly affected by fathers who provided medium or high levels of investment compared to low levels of investment. Oldest sons who spent a moderate amount of time with fathers (medium investment) had a higher level of educational attainment (1.23 more years of schooling) than oldest sons who spent little to no time with fathers (low investment). Similarly, oldest sons who spent a lot of time with fathers growing up (high investment) had a higher level of educational attainment (1.07 years of schooling) than oldest sons who spent little to no time with fathers (low investment). . This is not completely surprising since, as predicted, many fathers in this population who spend moderate amounts of time with children (medium investment) are also labor migrants who often provide indirect forms of investment (i.e. income) and continue to remain emotionally close to children even while absent. Fathers who provide low levels of investment, in which they rarely if ever spend time with their children, are likely to have divorced their wives, abandoned their families, or are dead. Not surprisingly then, oldest sons who spent a lot of time with fathers (high investment) also had significantly higher levels of educational attainment than oldest sons who spent little to no time with

fathers (low investment), and probably had less access to resources. These results are consistent with findings in the anthropological and psychological literature which show greater effects of father attributes on boys' outcomes versus girls' outcomes, although this thesis is not directly testing the effects between oldest sons and oldest daughters (e.g. Biller & Kimpton 1997; Santrock 1972; Draper & Harpending 1982).

The main predictors for levels of alloparental support, including direct alloparental investment, potential alloparent(s) in the household, and residing in father's *bari* had no significant effects on oldest sons' educational attainment. These variables, however, were primarily entered as controls and their results cannot be accurately interpreted due to the small sample size for some categories. Living in father's *bari*, however, did have a significant and positive effect on oldest daughters' level of educational attainment (over 1.85 more years of schooling) compared to living in mother's *bari* or outside of either *bari* (reference categories). This could suggest that girls benefit more by having nearby kin support networks than do boys, but this result should be interpreted with caution given the relatively small number (28) of oldest daughters living outside of the father's *bari*. The result is, however, consistent with the effect of the same variable in the full sample.

Table 5. Regression Results for Oldest Sons. Regression results show the effects of covariates on the outcome variable years of educational attainment for oldest sons in the sample (N = 407).

Educational Attainment for Oldest Sons	
Variable Category Variable Name	Unstandardized Beta Coefficient (Standard Error) ¹
Oldest Sons' Characteristics	
Age	0.132 (0.03)***
Still in School (dummy, yes = 1)	- 1.073 (0.54)*
Number of Siblings	0.187 (0.14)
Family Characteristics	
Mother's Education	0.125 (0.08) †
Father's Education	0.215 (0.06)***
Father's Age	0.031 (0.03)
Annual Household Income (logged) ²	0.012 (0.07)
Number of People in Household	- 0.176 (0.08)*
Time Spent With Fathers	
High Investment (dummy)	1.067 (0.58) †
Medium Investment (dummy)	1.238 (0.72) †
Kin Support Characteristics	
Reside in Father's <i>Bari</i> ³ (dummy)	0.185 (0.66)
Direct Alloparental Investment (dummy)	1.359 (1.11)
Potential Alloparent(s) in Household (dummy)	- 0.304 (0.45)

¹ Statistical significance is represented as follows: *** p < .001; ** p < .01;

* p < .05; † < .10

² Annual income was recorded in Bangladeshi Taka in 2010.

³ Father's *bari* includes the rare situations in which the mother's and father's natal *bari* are the same.

Table 6. Regression Results for Oldest Daughters. Regression results show the effects of covariates on the outcome variable years of educational attainment for oldest daughters in the sample (N = 405).

Educational Attainment for Oldest Daughters	
Variable Category Variable Name	Unstandardized Beta Coefficient (Standard Error) ¹
Oldest Daughters' Characteristics	
Age	0.071 (0.03)*
Still in School (dummy, yes = 1)	- 2.355 (0.52)***
Number of Siblings	- 0.019 (0.14)
Family Characteristics	
Mother's Education	0.026 (0.07)
Father's Education	0.217 (0.05)***
Father's Age	- 0.014 (0.02)
Annual Household Income (logged) ²	0.198 (0.07)**
Number of People in Household	0.075 (0.08)
Time Spent With Fathers	
High Investment (dummy)	0.132 (0.57)
Medium Investment (dummy)	0.822 (0.70)
Kin Support Characteristics	
Reside in Father's <i>Bari</i> ³ (dummy)	1.847 (0.66)**
Direct Alloparental Investment (dummy)	- 0.934 (1.01)
Potential Alloparent(s) in Household (dummy)	- 0.360 (0.43)

¹ Statistical significance is represented as follows: *** p < .001; ** p < .01;

* p < .05; † < .10

² Annual income was recorded in Bangladeshi Taka in 2010.

³ Father's *bari* includes the rare situations in which the mother's and father's natal *bari* are the same.

8. Discussion

Table 7. Summary of Results.

Theory Variable	Result	Prediction Supported?
<p>Parental Investment Theory</p> <p>(1) Father absent - labor migrant</p> <p>(2) Father absent - divorce/abandonment</p> <p>(3) Father absent – death</p> <p>(4) Father spent greater amounts of time (oldest sons)</p> <p>(4) Father spent greater amounts of time (oldest daughters)</p> <p>Cooperative Breeding Theory</p> <p>(1) Direct alloparental investment</p> <p>(2) Residing in father's bari</p> <p>(3) Living with potential alloparent(s)</p>	<p>positive & significant</p> <p>negative & significant</p> <p>negative & significant</p> <p>positive & significant</p> <p>no effect</p> <p>positive & significant</p> <p>positive & significant</p> <p>negative & significant</p>	<p>supported</p> <p>supported</p> <p>supported</p> <p>supported</p> <p>not supported</p> <p>supported</p> <p>supported</p> <p>not supported</p>

Children with absent fathers due to labor migration, a normative type of father absence in rural Bangladesh, show significant and slightly higher levels of educational attainment than children with present fathers. This is contrary to the majority of the findings in the psychology literature which claim that father absence, in general, has a negative effect on all children's educational outcomes (and other social developmental outcomes). This result is consistent, however, with the predictions of parental investment theory which suggest that increased investment will benefit childhood outcomes, regardless of whether the investment is indirect and/or received in the absence of fathers. Children with absent fathers due to divorce or abandonment show significantly lower levels of educational attainment compared to children with present fathers. This is not

surprising since father absence due to divorce and abandonment is highly stigmatized in rural Bangladesh, is non-normative, and is associated with limited resource access and little to no continued investment from fathers or their kin. Similarly, yet independently, children with absent fathers due to death also have significantly lower levels of educational attainment than children with present fathers. Father absence due to death is somewhat normative in Matlab, however, and it does not carry the stigma that father absence due to divorce or abandonment does. Children with absent fathers due to death, therefore, are more likely to receive continued support from paternal and maternal kin after a father's death.

Children with greater support from kin networks, either through direct alloparental investment or living in their fathers' natal *bari*, also have significant and slightly higher levels of educational attainment than children without these types of kin support. This is consistent with cooperative breeding theory which, similar to parental investment theory, suggests that investment from alloparents will benefit childhood outcomes. Interestingly, however, simply living with potential alloparents lowers educational attainment. This co-occurs with the negative effect of having more people in the household and suggests that individuals within a household who are not involved in sustained, direct alloparenting may be competing over resources instead of "helping at the nest." Furthermore, potential alloparents may be needy and many have their own children with them in the household. In this case, potential alloparents may be more concerned with increasing the benefits of their own offspring (through greater investment of time and/or resources) than with the offspring of their other kin. This could help to

explain the negative effect that living with potential alloparents in the household has on children's educational attainment.

Oldest sons benefit from spending more time with fathers, though there does not appear to be a similar effect for oldest daughters. The fact that oldest sons benefit by spending greater amounts of time with fathers (medium *and* high levels of investment is not surprising and is consistent with parental investment theory. Most fathers who provide high levels of investment are present and are able to spend more time with children than the other levels of paternal investment, but fathers who provide medium levels of investment are likely to be labor migrants and to provide investment in other ways (e.g. through earned income). For oldest daughters, logged annual household income has a significant and positive effect on educational attainment while for sons it appears to have no effect. This implies that regardless of income, families in rural Bangladesh find it more important for oldest sons to continue their education than oldest daughters. The implication for oldest daughters is that continued schooling is largely dependent upon whether families can financially afford for them to be in school, or whether they can afford to lose daughters' assistance with household tasks.

The effects of kin support networks on oldest sons' and oldest daughters' level of educational attainment also suggest that, contrary to oldest sons, oldest daughters may be more important providers of investment than receivers. Living in father's *bari* has a significantly positive effect on oldest daughters' education, but no effect on oldest sons' education. This implies that oldest sons may be invested in regardless of which *bari* they reside in and that oldest daughters may be helping with investment. Because we know that mothers in rural Bangladesh frequently only reside in their natal *baris* when they

have been divorced /abandoned or widowed and when they need greater support for themselves and/or their children, perhaps oldest daughters are required to help more (versus going to school) while living in their mother's *bari*. When living in their father's *bari* oldest daughters may have greater opportunities to continue their education because there is generally more support from kin, including alternative allopuments to watch younger children, and greater access to resources.

These results suggest that, at least in rural Bangladesh, father absence and paternal investment do matter, but what may matter more is whether fathers continue to invest when they are absent. As we know, father absence due to labor migration is normative in rural Bangladesh and these fathers can and still do continue to invest in their offspring when they are absent. Spending time with fathers also matters, but whether fathers spend time with children on a daily basis (high investment) versus a weekly or monthly basis (medium investment) does not seem to matter much if the reason for less investment is tied to a normative type of father absence (i.e. labor migration). Increased kin support networks, such as direct allopumental investment and residing in father's *bari* also benefit children's educational attainment. Conversely, having adult kin in the household appears to negatively affect children's education since they seem more involved with intra-household competition over resources than in allopumenting.

Conclusion

This thesis seeks to determine the effects of the presence and level of investment by fathers and allopuments on children's educational attainment in rural Bangladesh. Key findings of this thesis are that non-normative types of father absence like divorce and

desertion negatively affect children's level of educational attainment while normative forms of father absence like labor migration improve educational attainment. Overall, increased levels of kin support, such as direct alloparental investment, positively affect children's educational attainment. Conversely, having potential alloparents in the household negatively affects children's educational attainment. Finally, living in father's *bari* (patrilineal family compound) has a positive effect on children's level of educational attainment.

While labor migration in Matlab provides a useful example of a form of normative father absence, it is a recent development related to market integration. Ideally, these predictions should also be tested using data from a society where father absence is historically normative and traditionally prescribed, such as a matrifocal Caribbean society or a matrilineal society in Africa or Southeast Asia. Future research would also benefit by continuing to examine the effects of different types of father absence, especially different types of normative father absence, on childhood outcomes; cross-cultural research could only strengthen potential findings. With regard to alloparents, it is also important to consider more than simply the proximity in which kin live to children. In this thesis, potential alloparents are included based on whether they live in the household, but "household" has many meanings cross-culturally. Moreover, individuals in the household may compete over resources more than they contribute towards alloparenting efforts, while individuals living in neighboring households may provide alloparental investment. Measures of direct alloparenting are also key to a good understanding of the effects of kin on child outcomes.

Whether the distinction between normative and non-normative types of father absence is necessary or makes sense to use in all contexts is a point of debate and is possibly a limitation of this thesis. Father absence due to death, for example, occurs everywhere and could possibly be considered somewhat normative in all social contexts. It could also be considered non-normative depending on the child's age at father's death. This makes father absence due to death hard to categorize on this scale. A parallel argument involves normative types of father absence which could be considered non-normative in some situations. In polygynous marriages, for example, most children live in 'single-mother households' with normative father absence. Even though this type of father absence from the household may be considered normative, father absence from the family may not be. Furthermore, these fathers may remain emotionally engaged with and investing in children even if they are not living with them. The difficulty in defining normative and non-normative, therefore, seems to lie in the interrelated meanings of 'absence.' There are after all, different reasons for absence, different stigmas attached to some forms of absence, different lengths of absence, absence from the household but presence nearby (and/or still investing), absence from the household and absent in proximity, and even father presence in the household but child absence (as in the case presented in Tonga). Perhaps the best definition of normative and non-normative father absence, and an important part of future cross-cultural research, would simply be to include additional measures of the types of absence and their social acceptability, including reason for absence, length of absence, proximity of absent fathers, continued investment by fathers, and whether fathers remain emotionally involved with their children or not.

This thesis was prepared in direct response to stereotypes about the family that pervade the psychology literature and influence assumptions about normal human child development; specifically, that children need one mother and one father to equally provide investment (Lamb 2010). In order to gain a more complete understanding of children's educational attainment and other areas of social development, and to further determine whether other types of father absence negatively impact these outcomes universally, future behavioral studies need to broaden research efforts to include populations in non-Western, non-industrial societies. Not only could these findings lay the foundation for future longitudinal research to help better understand paternal investment and its use as an adaptive strategy, but they would help broaden Western academic conceptualizations about the family and help forge a more accurate understanding of universal child development.

Considering the wide range of differences we see in the roles that fathers play cross-culturally, the degree to which they vary in their investment in offspring, and their presence or absence in the household, one should begin to question behavioral studies that continually test the effects of family dynamics on childhood outcomes using subjects restricted to Western industrial societies. These studies are important for understanding child development in these contexts, but it is possible to understand more about ourselves and to become better prepared to address solutions to negative outcomes by learning more about human behavior in other parts of the world.

Bibliography

- Alcorta, C. (1982). Paternal behavior and group competition. *Behavior and Science Research, 17*: 7-23.
- Aldous, J., & Mulligan, G. (2002). Fathers' child care and children's behavior problems: A longitudinal study. *Journal of Family Issues, 23*: 624-647.
- Alexander, R. D. (1990). How did humans evolve? Reflections on the uniquely unique species. *Museum of Zoology, The University of Michigan*. Special Publication No.1: 1-34.
- Alwin, D.F., Converse, P.E., & Martin, S.S. (1985). Living arrangements and social integration. *Journal of Marriage and the Family, 47*: 319-334.
- Amato, P. R. (2006). Marital discord, divorce, and children's well-being: Results from a 20-year longitudinal study of two generations. In A. Clarke-Stewart & J. F. Dunn (Eds.), *Families count: Effects on child and adolescent development* (pp. 179-202). New York: Cambridge University Press.
- Amato, P.R. (2001). Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology, 15*: 355-370.
- Amato, Paul R. (1994). Father-child relations, mother-child relations, and offspring psychological well-being in early adulthood. *Journal of Marriage and Family, 56*: 1031-1042.
- Amato, P. & Gilbreth, J. (1999). Nonresident fathers and children's well-being: A meta-analysis. *Journal of Marriage and Family, 61*: 557-573.
- Amato, P.R., & Keith, B. (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin, 110*: 26-46.
- Amato, P.R., Loomis, L.S., and Booth, A. (1995). Parental divorce, marital conflict, and off-spring well-being during early adulthood. *Social Forces, 73*: 895-915.
- Anderson, K.G., Kaplan, H., Lam, D., & Lancaster, J. (1999). Paternal care by genetic fathers and stepfathers II: Reports by Xhosa high school students. *Evolution and Human behavior, 20*: 433-451.
- Anderson, K. G., Kaplan, H., & Lancaster, J. B. (2007). Confidence of paternity, divorce, and investment in children by Albuquerque men. *Evolution and Human Behavior, 28*: 1-10.

- Arnett, J. (2008). The neglected 95%: Why American psychology needs to become less American. *American Psychologist*, *63*: 602-14.
- Astone, N.M., & McLanahan, S.S. (1991). Family structure, parental practices, and high school completion. *American Sociological Review*, *56*: 309-320.
- Belsky, J. (2005). Differential susceptibility to rearing influence. In B.J. Ellis & D.F. Bjorklund (Eds.), *Origins of the social mind: Evolutionary psychology and child development* (pp. 139-163). New York: Guilford Press.
- Belsky, J., Steinberg, L., & Draper, P. (1991). Childhood experience, interpersonal development, and reproductive strategy: An evolutionary theory of socialization. *Child Development*, *62*: 647-670.
- Biller, H.B. & Kimpton, J.L. (1997). The father and the school-aged child. In M.E. Lamb (Ed.), *The role of the father in child development*. (pp. 143-161). New York: John Wiley & Sons, Inc.
- Bird, R.A. (1999). Cooperation and conflict: The behavioral ecology of the sexual division of labor. *Evolutionary Anthropology*, *8*: 65-75.
- Bjorklund, A. & Sundstrom, M. (2006). Parental separation and children's educational attainment: A siblings analysis on Swedish register data. *Economica*, *73*: 605-624.
- Blurton Jones, N.G., Marlowe, F., Hawkes, K., & O'Connell, J.F. (2000). Paternal investment and hunter-gatherer divorce rates. In N. Chagnon, L. Cronk, & W. Irons (Eds.), *Adaptation and human behavior: An anthropological perspective*. (pp. 69-90). New York: Aldine Press.
- Bogin B. (1998). Evolutionary and biological aspects of childhood. In C. Patner-Brick (Ed.) *Biosocial perspectives on children* (pp. 10-44). Cambridge, UK: Cambridge University Press.
- Bogin B. (1997). Evolutionary hypotheses for human childhood. *Yearbook of Physical Anthropology*, *40*: 63-89.
- Bogges, S. (1998). Family structure, economic status, and educational attainment. *Journal of Population and Economics*, *11*: 205-222.
- Booth, M.Z. (1996). Parental availability and academic achievement among Swazi rural primary school children. *Comparative Education Review*, *40*: 250-263.
- Borgerhoff Mulder, M. & Milton, M. (1985). Factors affecting infant care in the Kipsigis. *Journal of Anthropological Research*, *41*: 231-262.

- Boyce, W.T., & Ellis, B.J. (2005). Biological sensitivity to context I: An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, 17: 271-301.
- Brown, J.L. (1987). *Helping and Communal Breeding in Birds*. Princeton, NJ: Princeton University Press.
- Chisholm, J.S. (1981). Residence patterns and the environment of mother-infant interaction among the Navaho. In T. Field, A. Sostek, P. Vietze, & P. Leiderman (Eds.) *Culture and Early Interactions*. (pp. 3-19). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Clutton-Brock, T. H. (1991). *The Evolution of Parental Care*. Princeton, NJ: Princeton University Press.
- Coley, R. (1998). Children's socialization experiences and functioning in single-mother households: The importance of fathers and other men. *Child Development*, 69: 219-230.
- Cooksey, E.C. & Fondell, M.M. (1996). Spending time with his kids: effects of family structure on fathers' and children's lives. *Journal of Marriage and Family*, 58: 693-707.
- Couch, K.A. & Lillard, D.R. (1997). Divorce, educational attainment, and the earnings mobility of sons. *Journal of Family and Economic Issues*, 18: 231-245.
- Cummings, E. M., & O'Reilly, A. W. (1997). Fathers and family context: Effects of marital quality on child adjustment. In M.E. Lamb (Ed.), *The role of fathers in child development*, 3rd ed. (pp. 49-65, 318-325). New York: John Wiley & Sons.
- Da Cruz Benetti, S.P. & Roopnarine, J. (2006). Paternal investment with school-aged children in Brazilian families: Association with childhood competence. *Sex Roles*, 55: 669-678.
- Daly, M. & Wilson, M. (1988). Evolutionary social psychology and family homicide. *Science*, 242: 519-524.
- Douaire-Marsaudon, F. (1996). Neither black nor white: The father's sister in Tonga. *The Journal of the Polynesian Society*, 105: 139-164.
- Draper, P. and Harpending, H. (1982). Father absence and reproductive strategy: An evolutionary perspective. *Journal of Anthropological Research*, 38: 255-273.
- Dubow, E.F., Tisak, J., Causey, D., Hryshko, A., & Reid, G. (1991). A two-year longitudinal study of stressful life events, social support, and social problem-

- solving skills: Contributions to children's behavioral and academic adjustment. *Child Development*, 62: 583-599.
- Evans, M.D.R., Kelley, J., & Wanner, R.A. (2001). Educational attainment of the children of divorce: Australia, 1940-90. *Journal of Sociology*, 37: 275-297.
- Flinn, M.V. (2011). Evolutionary anthropology of the human family. In C. Salmon & T. Shackelford (Eds.), *Oxford handbook of evolutionary family psychology*. (pp. 12-32). Oxford: Oxford University Press.
- Flinn, M.V. (2006). Evolution and ontogeny of stress response to social challenges in the human child. *Developmental Review*, 26: 138-174.
- Flinn, M.V. (1988). Step and genetic parent/offspring relationships in a Caribbean village. *Ethology and Sociobiology*, 9: 335-369.
- Flinn, M.V. (1981). Uterine and agnatic kinship variability. In R.D. Alexander & D.W. Tinkle (Eds.), *Natural selection and social behavior: recent research and new theory*. (pp. 439-475). New York: Blackwell Press.
- Flinn M.V. & Leone D.V. (2009). Alloparental care and the ontogeny of glucocorticoid stress response among stepchildren. In G. Bentley & R. Mace, (Eds.), *Alloparental care in human societies. Biosocial Society Series*. (pp. 212-231). Oxford: Berghahn Books.
- Flinn, M.V. & Leone, D.V. (2006). Early family trauma and the ontogeny of glucocorticoid stress response in the human child: Grandmother as a secure base. *Developmental Processes*, 1: 243-275.
- Flinn, M.V. & Low, B.S. (1986). Resource distribution, social competition, and mating patterns in human societies. In D. Rubenstein & R. Wrangham (Eds.), *Ecological aspects of social evolution*. (pp. 217-243). Princeton NJ: Princeton University Press.
- Flinn MV, Quinlan RL, Ward CV, & Coe MK (2007). Evolution of the human family: Cooperative males, long social childhoods, smart mothers, and extended kin networks. In C. Salmon & T. Shackelford (Eds.), *Family relationships*. (pp. 16-38). Oxford: Oxford University Press.
- Flouri, E. & Buchanan, A. (2004). Early father's and mother's involvement and child's later educational outcomes. *British Journal of Educational Psychology*, 74: 141-153.
- Flouri, E., Buchanan, A., & Bream, V. (2002). Adolescents' perceptions of their fathers' involvement: Significance to school attitudes. *Psychology in the Schools*, 39: 575-582.

- Fouts, H. (2008). Father involvement with young children among the Aka and Bofi foragers. *Cross-Cultural Research*, 42: 290-312.
- Freud, S. (1921). Group psychology and the analysis of the ego. In J. Strachey (Ed. and Trans.), *The standard edition of the complete works of Sigmund Freud* (Vol. 18, pp. 67-143). London: Hogarth Press, 1955.
- Freud, S. (1909). Analysis of a phobia in a five-year old boy. In J. Strachey (Ed. and trans.) *The standard edition of the complete psychological works of Sigmund Freud*, (Vol. 10, pp. 5-149). London: Hogarth Press, 1953.
- Freud, S. (1900). The interpretation of dreams. In J. Strachey (Ed. and Trans.), *The standard edition of the complete works of Sigmund Freud* (Vol. 10, pp. 5-149). London: Hogarth Press, 1955.
- Furstenburg, F. & Crawford, A. (1978). Family support: helping teenage mothers to cope. *Family Planning Perspectives*, 10: 322-333.
- Gahler, M. (1998). Self-reported psychological well-being among adult children of divorce in Sweden. *Acta Sociologica*, 41: 209-225.
- Geary, D.C. (2005). Evolution of paternal investment. In D.M. Buss (Ed.), *The evolutionary psychology handbook* (pp.483-505). Hoboken, NJ: John Wiley & Sons.
- Geary, D.C. (2010). *Male, Female: The Evolution of Human Sex Differences*, 2nd edition. Washington, DC: American Psychological Association.
- Geary, D.C. (2000). Evolution and Proximate expression of human paternal investment. *Psychological Bulletin*, 126: 55-77.
- Geary D.C. & Flinn, M.V. (2001). Evolution of human parental behavior and the human family. *Parenting: Science and Practice* 1: 5-61.
- Gibson, M. & Mace, R. (2005). Helpful grandmothers in rural Ethiopia: A study of the effect of kin on child survival and growth. *Evolution and Human Behavior*, 26: 469-482.
- Glasse, R. M. (1968). *Huli of Papua: A Cognatic Descent System*. Paris/The Hague: Mouton and Company.
- Glasse, R. M. (1965). The Huli of the Southern Highlands. In P. Lawrence and M.J. Meggitt (Eds.), *Gods, Ghosts and Men in Melanesia: Some Religions of Australian New Guinea and the New Hebrides* (pp. 27-49). London: Oxford University Press.

- Goody, J. (1973). Bridewealth and dowry in Africa and Eurasia. In J.R. Goody & S.J. Tambiah (Eds.), *Bridewealth and Dowry*. Cambridge, UK: Cambridge University Press.
- Gottlieb, A. (2009). Who Minds the Baby? In G. Bentley & R. Mace (Eds.), *Substitute parents: biological and social perspective on alloparenting across human societies* (pp.115-138). New York & Oxford: Berghahn Books.
- Gough, K. (1955). Female initiation rites on the Malabar Coast. *Journal of the Royal Anthropological Institute*, 85: 45-80.
- Hadley, C. (2004). The costs and benefits of kin: Kin networks and children's health among the Pimbwe of Tanzania. *Human Nature*, 15: 377-395.
- Hamilton, W.D. (1964). The genetical evolution of social behaviour I. *Journal of Theoretical Biology*, 7: 1-16.
- Hames, R.B. (1992). Variation in paternal investment among the Yanomamo. In, Hewlett, B. (Ed.), *Father-child relations: Cultural and biosocial contexts*. (pp. 85-110) New York: Aldine de Gruyter.
- Harkness, S. & Super, C.M. (1992). The cultural foundations of father's roles: Evidence from Kenya and the United States. In B.S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial perspectives* (pp. 191-212). New York: Aldine de Gruyter.
- Hawkes, K. (2003). Grandmothers and the evolution of human longevity. *American Journal of Human Biology*, 15: 380-400.
- Hawkes, K. (1990). Why do men hunt? Some benefits for risky strategies. In E. Cashdan (Ed.), *Risk and Uncertainty in Tribal and Peasant Economies*. (pp. 145-166). Boulder, CO: Westview Press.
- Hawkes, K., O'Connell, J.F., & Blurton Jones, N. (1997). Hadza women's time allocation, offspring provisioning, and the evolution of long postmenopausal life-spans. *Current Anthropology*, 38: 551-77.
- Hawkes, K., O'Connell, J.F., & Blurton-Jones, N. (2001). Hunting and nuclear families. *Current Anthropology*, 42: 68-710.
- Henrich, J., Heine, S., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33: 61-135.
- Hetherington, E.M., Stanley-Hagen, M., & Anderson, E.R. (1989). Marital transitions: A child's perspective. *American Psychologist*, 44: 303-312.

- Hetherington, E.M., Camara, K.A., & Featherman, D.L. (1983). Achievement and intellectual functioning of children in one-parent households. In J. Spence (Ed.) *Achievement and achievement motives* (pp.205-284). San Francisco, CA: Freeman Press.
- Hewlett, B. S. (2004). Father's role in forager, farmer and pastoral cultures. In M. E. Lamb (Ed.), *The role of the father in child development, 4th ed.* (pp. 182-195). New York: Wiley.
- Hewlett, B.S. (1988). *Dad and cad strategies: Father's role in human evolution*. Paper presented at Evolution and Human Behavior Program, University of Michigan, Ann Arbor.
- Hewlett, B.S. (1992). Husband-wife reciprocity and the father-infant relationship among Aka pygmies. In B.S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial perspectives* (pp. 153-176). New York: Aldine de Gruyter.
- Hewlett, B. S. (1991a). *Intimate fathers: The nature and context of Aka pygmy paternal infant care*. Ann Arbor, MI: University of Michigan Press.
- Hewlett, B.S. (1991b). Demography and childcare in preindustrial societies. *Journal Anthropological Research, 47*: 1-37.
- Hewlett, B.S. (1987). Intimate fathers: Patterns of paternal holding among Aka pygmies. In M.E. Lamb (Ed.) *The father's role: Cross-cultural perspectives* (pp.295-330). Hillsdale, NJ: Erlbaum.
- Hewlett, Barry S. & Macfarlan, Shane J. (2010). Fathers' roles in hunter-gatherer and other small-scale cultures. In M.E. Lamb (Ed.) *The role of the father in child development*. (pp. 413-432). Hoboken, NJ: John Wiley & Sons, Inc.
- Hill, K., Barton, M., and Hurtado, A.M. (2009). The emergence of human uniqueness: Characters underlying behavioral modernity. *Evolutionary Anthropology, 18*: 187-200.
- Hill, K., & Hurtado, A. (1996). *Ache life history: The ecology and demography of a foraging people*. New York: Aldine de Gruyter.
- House, J.S., Umberson, D., & Landis, K.R. (1988). Structures and processes of social support. *Annual Review of Sociology, 14*: 293-318.
- Hrdy, S.B. (2009). *Mothers and others: evolutionary origins of mutual understanding*. Cambridge, MA: Belknap Press.

- Hrdy, S.B. (2005). Comes the child before the man: How cooperative breeding and prolonged postweaning dependence shaped human potentials. In B. Hewlett & M.E. Lamb (Eds.), *Hunter gatherer childhood: Evolutionary, developmental, & cultural perspectives*. (pp. 65-91). Piscataway, NJ: Transactions.
- Hrdy, S.B. (1999). *Mother nature: Maternal instincts and how they shape the human species*. New York: Ballantine Books.
- Hurtado, M., Hawkes, K., Hill, K., & Kaplan, H. (1992). Trade-offs between female food acquisition and childcare among Hiwi and Ache foragers. *Human Nature*, 3: 1-28.
- Ivey, P. (2000). Cooperative reproduction in Ituri Forest hunter-gatherers: Who cares for Efe infants? *Current Anthropology*, 41: 856-866.
- Jaffee, Sara R., Van Hulle, Carol, & Rodgers, & Joseph L. (2011). Effects of nonmaternal care in the first 3 years on children's academic skills and behavioral functioning in childhood and early adolescence: A sibling comparison study. *Child Development*, 82: 1076-1091.
- Jones, K. (2004). Assessing psychological separation and academic performance in nonresident-father and resident-father adolescent boys. *Child and Adolescent Social Work Journal*, 21: 333-354.
- Joshi, S. (2004). Female household-headship in rural Bangladesh: incidence, determinants and impact on children's schooling. *Economic Growth Center: Center Discussion Paper No. 894*: 1-48.
- Kaplan, H.S., Lancaster, J.B., Brock, J.A., & Johnson, S.E. (1995). Does observed fertility maximize fitness among New Mexican men? A test of an optimality model and a new theory of parental investment in the embodied capital of offspring. *Human Nature*, 6: 325-360.
- Katz, M., & Konner, M. (1981). The role of the father: An anthropological perspective. In M.E. Lamb (Ed.), *The Role of the Father in Child Development* (pp.155-186). New York: Wiley.
- Kramer, K.L. (2005). Children's help and the pace of reproduction: Cooperative breeding in humans. *Evolutionary Anthropology*. 14: 224-237.
- Kramer, K.L. (2004). Reconsidering the cost of childbearing: The timing of children's helping behavior across the life cycle of Maya families. In, Alvard, M. (Ed.) *Socioeconomic aspects of human behavioral ecology*. (pp. 35-353). Amsterdam: Elsevier.
- Lamb, M.E. (2010). *The Role of the Father in Child Development*, 5th ed. New Jersey: John Wiley & Sons, Inc.

- Lamb, M.E. (2004). *The Role of the Father in Child Development*, 4th ed. New Jersey: John Wiley & Sons, Inc.
- Lang, K. & Zagorsky, J.L. (2001). Does growing up with a parent absent really hurt? *The Journal of Human Resources*, 36: 253-273.
- Leonetti, D.L., Nath, D.C., & Hemam, N.S. (2007). In-law conflict: Women's reproductive lives and the roles of their mothers and husbands among the matrilineal Khasi. *Current Anthropology*, 48: 861-890.
- Leonetti, D.L., Nath, D.C., Hemam, N.S., & Neill, D.B. (2004). Do women really need marital partners to support their reproductive success? The case of the matrilineal Khasi of N.E. India. In M. Alvard (Ed.), *Socioeconomic aspects of human behavioral ecology* (pp. 151-174). Oxford: Elsevier.
- Lewis, C. & Lamb, M. (2003). Fathers' influence on children's development: The evidence from two-parent families. *European Journal of Psychology of Education*, 18: 211-228.
- Marlowe, F.W. (2005). Who tends Hadza children? In B.S. Hewlett & M.E. Lamb (Eds.), *Hunter-gatherer childhoods: Evolutionary, developmental, and cultural perspectives* (pp.177-190). New Brunswick, NJ: Aldine.
- Marlowe, F.W. (2003). A critical period for provisioning by Hadza men: Implications for pair bonding. *Evolution and Human Behavior*, 24: 217-229.
- Marlowe, F.W. (2000). Paternal investment and the human mating system. *Behavioural Processes*, 51: 45-61.
- Marlowe, F.W. (1999). Male care and mating effort among Hadza foragers. *Behavioral Ecology and Sociobiology*, 46: 57-64.
- McLanahan, S. & Booth, K. (1989). Mother-only families: Problems, prospects, and politics. *Journal of Marriage and Family*, 51: 557-580.
- McLanahan, S. & Sandefur, G. (1994). *Growing up with a single parent, what hurts, what helps*. Cambridge, MA: Harvard University Press.
- McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American Psychologist*, 53: 185-204.
- Meehan, C.L. (2005). The effects of residential locality on parental and alloparental investment among the Aka foragers of the Central African Republic. *Human Nature*, 16: 58-60.

- Morelli, G.A., & Tronick, E.Z. (1992). Male care among Efe foragers and Lese farmers. In B.S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial contexts* (pp. 231-261). New York: Aldine.
- Munroe, R.L. (2002). Father absence, social structure, and attention allocation in children: A four-culture comparison. *Ethos*, 29: 315-328.
- Murray, C. (1984). *Losing ground: American social policy, 1950-1980*. New York: Basic Books.
- Murray, A., & Sandqvist, K. (1990). Father absence and children's achievement from age 13 to 21. *Scandinavian Journal of Educational Research*, 34: 3-28.
- Nobles, J. (2011). Parenting from abroad: migration, nonresident father involvement, and children's education in Mexico. *Journal of Marriage and Family*, 73: 729-746.
- Palkovitz, R. (2002). Involved fathering and child development: Advancing our understanding of good fathering. In C. S. Tamis-LeMonda & N. Cabrera (Eds.), *Handbook of father involvement: Multidisciplinary perspectives* (pp. 119-140). Mahwah, NJ: Erlbaum.
- Pong, S., Dronkers, J., & Hampden-Thompson, G. (2003). Family policies and children's school achievement in single- versus two-parent families. *Journal of Marriage and Family*, 65: 681-699.
- Pong, S. & Ju, D. (2000). The effects of change in family structure and income on dropping out of middle and high school. *Journal of Family Issues*, 21: 17-168.
- Quinlan R.J., Quinlan M.B., & Flinn M.V. (2005). Local resource enhancement & sex-biased breastfeeding in a Caribbean community. *Current Anthropology*, 46: 471-480.
- Rozin, P. (2006). Domain denigration and process preference in academic psychology. *Perspectives on Psychological Science*, 1: 365-376.
- Santrock, J. (1972). Relation of type and onset of father-absence to cognitive development. *Child Development*, 43: 455-469.
- Sear, R. & Mace, R. (2008). Who keeps children alive? A review of the effects of kin on child survival. *Evolution and Human Behavior*, 29: 1-18.
- Shenk, M.K., Starkweather, K.E., Kress, & H.C., Alam, N. (2012). Does absence matter? A comparison of three types of father absence in rural Bangladesh. *Human Nature*, in press.

- Shenk, M.K. and Scelza, B.A. (2012). Paternal investment and status-related child outcomes: Timing of father's death affects offspring success. *Journal of Biosocial Science*, in press.
- Solomon, N.G., & Hayes, L.D. (2009). The Biological Basis of Alloparental Behavior in Mammals. In G. Bentley & R. Mace (Eds.), *Substitute parents: Biological and social perspective on alloparenting across human societies* (pp.13-49). New York & Oxford: Berghahn Books.
- Stone, L. (2010). *Kinship and Gender: An Introduction, 4th ed.* Boulder, CO: Westview Press.
- Sue, S. (1999). Science, ethnicity, and bias: Where have we gone wrong? *American Psychologist*, 54: 1070-1077.
- Townsend, N., Madhavan, S., Tollman, S., Garenne, M., & Kahn, K. (2002). Children's residence patterns and educational attainment in rural South Africa, 1997. *Population Studies*, 56: 215-225.
- Trivers, R.L. (1974). Parent-offspring conflict. *American Zoologist*, 14: 249-264.
- Trivers, Robert L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man 1871-1971* (pp.136-179). Chicago: Aldine.
- Turke, P. (1988). Helpers at the nest: childcare networks on Ifaluk. In, L. Betzig, M. Borgerhoff Mulder & P. Turke (Eds.). *Human reproductive behavior*. (pp. 173-188). Cambridge: Cambridge University Press.
- Van den Berghe, P.L. (1979). *Human family systems: An evolutionary view*. New York: Elsevier.
- Walker, R.S., Flinn, M.V., & Hill, K.R. (2010). Evolutionary history of partible paternity in lowland South America. *Proceedings of the National Academy of Sciences, USA* 107: 19195-19200.
- Wilson, W.J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.
- Winking, J. (2006). Are men really that bad as fathers? The role of men's investments. Paper prepared for the IUSSP Seminar on Male Life History in Giessen, Germany, October 10-12, 2006, 53: 100-115.
- Winking, J., Gurven, M., Kaplan, H., & Stieglitz, J. (2009). The goals of direct paternal care among a South Amerindian population. *American Journal of Physical Anthropology*, 139: 295-304.

Winterhalder, B. & Smith, E. (1992). Evolutionary ecology and the social sciences. In E.A. Smith & B. Winterhalder (Eds.). *Evolutionary Ecology and Human Behavior* (pp. 3-23). New York: Aldine de Gruyter.

The World Bank. (2011). Retrieved July 19, 2012 from <http://data.worldbank.org/country/bangladesh>