ABSTRACT

Title of dissertation:	GIRLS' EDUCATION IN INDIA: A MULTILEVEL EXAMINATION FROM A CAPABILITY PERSPECTIVE
	Pragati Godbole, Doctor of Philosophy, 2015
Dissertation directed by:	Dr. Robert G. Croninger, Associate Professor Department of Teaching, Learning, Policy, and Leadership

This quantitative study, guided by the Capability Approach (Sen, 1999), examines how effective opportunities or contextual capabilities influence educational outcomes or education functionings of children, specifically girls in India. Using hierarchical linear modeling techniques and controlling for individual conversion factors, this study explores the links between contextual capabilities such as life, bodily integrity, and political empowerment and the gender gap in children's functionings – reading, arithmetic, and writing proficiency. The study also investigates the relationship between contextual capabilities and the acquisition of these functionings for children in general. Drawn from the India Human Development Survey (Desai, et al., 2007), I used data from 11,345 children (ages 8-11) in 500 rural and urban districts across India. The relationship of contextual capabilities and educational functionings as measured in this study seems to be a complex one. Contextual capabilities of bodily integrity, political empowerment, and adult female education reduced the gender gap in reading and arithmetic proficiency in

rural districts and adult female education also reduced the gender gap in arithmetic proficiency in urban districts. Contextual capabilities also had modest associations with reading, arithmetic, and writing proficiency in several models but the direction of some relationships was unanticipated. This study seeks to contribute to literature on Capability Approach and provides a possible way to operationalize capabilities by empirically distinguishing between contextual capabilities and individual functionings. Findings have implications for further research on girls' education and education of other traditionally marginalized groups.

GIRLS' EDUCATION IN INDIA: A MULTILEVEL EXAMINATION FROM A CAPABILITY PERSPECTIVE

By

Pragati Godbole

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2015

Advisory Committee:
Professor Robert G. Croninger, Chair
Dr. Mark Brimhall-Vargas
Dr. David A. Crocker
Professor Sonalde Desai
Professor Steven J. Klees

PREFACE

"Geetha Naik is an 11 year old girl who lives with her family in the village of Tipapura Tanda. She's the youngest child and was taken out of school when she was 9. She can barely read and write. 'It's been 2 years since I left school. I had to leave school because I had to work at home. I take care of the goats and do all the housework for my parents.' For a girl like Geetha, poverty and tradition work together to keep her uneducated or dependent. 'Everyday I wake up early at 6 am. First, I collect water for cooking and bathing. I sweep, wash all the jars and pots. After, I take the goats out to graze in the fields.' Village life depends heavily on women, and young girls are expected to do their share. 'There are no days off. The work must be done or the family cannot eat. I do this grazing everyday even on holidays. It's so difficult. I wanted to study but my parents made me leave school to watch over the goats. Most of the village boys attend school everyday. The boys tease me. They see me going by with my goats. They say - See Geetha, we are going to school; you are grazing goats- and I told them, Go! Go! to school. But I wish I was going there with them.'"— Audio Transcript from UN Works, 2011.[1]

Based on a quantitative analysis of 11,345 children, this dissertation describes my interpretation of the many untold stories of girls in India who have never been to or learned in school. Although Geetha is a rare case in the dataset that I use for my analyses, the data still identify differences in achievement between young girls and boys in India, especially in rural settings.

[1] See also *United Nations Resources for Speakers on Global Issues.* http://www.un.org/en/globalissues/briefingpapers/youth/girls.shtml.

DEDICATION

To my grandparents and my beacons,

Vasant C. & Vimal Lele

RajaRam S. & Dr. Malati Godbole

ACKNOWLEDGEMENTS

I owe thanks to many on my journey of research and the completion of this dissertation. First, and foremost, I'd like to thank my committee for their invaluable guidance and feedback on this dissertation. To my chair and supervisor, Dr. Robert G. Croninger, I extend my heartfelt gratitude. An urban-legend, Dr. Croninger embodies the true spirit of a *guru*. Through his scholarship, excellence, industry, and kindness, Bob has taught me lessons that should last me a lifetime. This work would never have been completed without his patience, his sense of humor, and his constant guidance.

I am also grateful for the advice and support of my committee members, all stalwarts in their fields. A sincere thanks to Dr. David Crocker for introducing me to the theoretical framework that undergirds this work, and that aligns with my personal philosophy; to Dr. Sonalde Desai for her deep knowledge of sociology, India, and for making the India Human Development Study 2005 dataset accessible to researchers; to Dr. Steven J. Klees for his "critical" courses in international education and development and his encouragement for the completion of this work; and lastly, to Dr. Mark Brimhall-Vargas for his extensive knowledge on diversity and gender issues and for bringing me along by jumping in late in the game and contributing much. I additionally wish to thank Dr. Nelly Stromquist for her incisive feedback during the proposal stage and her many references that strengthened my work.

Most importantly, I would like to thank my family and friends who have supported me through the years. To my parents, I owe EVERYTHING. They are the roots that have kept me grounded and the sun-loving branches that have helped me see the sky. And to my mother-in-law I owe thanks for her presence, her family, her sense of

duty, her constant faith in me, and for the diamond bracelet! To my dearest husband: Supratik Chaudhuri, I am indebted. Thank you for loving me always, and appreciating me during my worst times (since you've only known me as a doctoral student, the best is yet to come). To my twinkling children - Sahana and Soham- I am grateful for their being such good teachers. Thank you for your joy and cheerfulness, your infinite cuddles, and your gifts of sweet dreams every night that helped me to refuel for everyday.

My dearest sister, Swati Godbole-Fanthome, served as my unpaid, on-call counselor and with Fredric Fanthome and Summit Chaudhuri, served as my critical reader for n-drafts of this document and others during my graduate career. To my extended family in India Rajesh & Dr. Aruna Sharma, Vijay & Meera Godbole, Rajeev and Kiran Godbole, , Nali Aji, Lalit & Mona Advani: I acknowledge them for their love, appreciation, and being a non-stop cheering squad. I also want to thank my parental figures Drs. Aruna & Suresh Vade for their open arms and warm hearth which brought me to them every winter. My cousins Anand Vade, Drs. Shilpa Vade Mehta and Semil Mehta, propped me up many a time when I was spent or dejected and my daily conversations about my work and self-discovery with Shilpa were only rivaled by the marathon conversations with Swati.

I would also like to thank countless friends and comrades on this journey: To dearest Dr. Dierdre Williams for all the fun classes, car-rides, and late night hangouts and music she brought to my life; to Dr. Beth Douthirt-Cohen for her positivity, pertinent feedback, and for her faith in me; to Dr. Cara Jackson thanks for so-generously extending her time and statistics expertise by being literally on-call and only a text away; and to Dr.

Lisa Swayhoover for contributing, among other gifts, her impeccable organizational skills with zest and sincerity.

A special shout-out to Dr. Lenisa Joseph for pulling me back from the abyss on many an occasion, to Angel Miles for extending kindness and sympathy, and continuing to be my friend and to Hetal Thukral for her friendship, feedback, love and so much more. For encouragement and hand-holding at various stages I acknowledge - Drs. Justin Van Fleet, Maritza Gonzalez , Tomoko Tokunaga, Belinda Hwang, Mark Brimhall-Vargas, Joann Prosser, Anita Sanyal, Raquel Gonzalez, and Deepa Srikantaiah.
Libby (Susan) Bixby and Benjamin Skolnik, Shayna Skolnik and Ramon Linan, Betty and Bob Sonneveldt, Dr. David Edwards and Rosana Martinelli became our extended family and helped to make our hearts, and our home warm in a foreign land.
A special thanks to Stephanie Goodwin and Lattisha Hall for being always-available-any-time advisors and to Joseph Robertson for being such a supportive supervisor in the final stages of writing.

Finally, I would like to acknowledge that this research was partially supported by the Dean's Fellowship for Dissertation Research and Writing Grant from the Department Teaching, Learning, Policy and Leadership at the College of Education, University of Maryland. The financial support is much appreciated.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT

Since international attention was first directed to the issue in the 1960s, and despite substantial gains in women's and girls' education, women and girls continue to remain under-represented in education relative to men and boys in the first decade of the twenty-first century (Unterhalter, 2008). Fewer girls persist in education programs – formal or non-formal – fewer receive technical or vocational training, and many girls fail to continue in postsecondary education.

In 2006, India accounted for the highest absolute number of out-of-school children such that almost 23% of the world's out-of-school children resided in India (UNESCO Institute for Statistics, 2006). In addition, gender disparities were greater in India. Whereas, on average, 116 girls were out-of-school for every 100 boys across a sample of eighty countries, almost 136 girls were out-of-school for every 100 boys in India (UNESCO, 2006). Recent policy changes in India have dramatically reduced the number of out-of-school children from 20 million to 4 million between 2002 and 2008 (UNESCO Institute for Statistics, 2011). But, as India rushes to meet the 2015 Millennium Development Goals, which range from halving extreme poverty to halting the spread of HIV/AIDS to enrolling all children in school, it becomes important to understand why children, particularly girls, continue to remain out-of-school or have poorer learning levels.

International reports from around the world amply show the poor status of girls' education. According to Education for All (EFA) Global Monitoring Reports focusing on education for the marginalized (UNESCO, 2010; UNESCO, 2011), women and girls lag behind men and boys at all levels of education. A reported 759 million adults lack basic

literacy skills and women account for two thirds of this population. According to the same report, 72 million children were out-of-school in 2007, of which 54% were girls (UNESCO, 2010). As with primary age children, fewer adolescent girls attend secondary school as compared with boys. While transition to secondary education is difficult for many children, girls face particular barriers. In addition to schooling costs, distance from schools, and labor demands, girls' education is impeded by deeply ingrained social, cultural, and economic biases (Colclough, 2004; Kane, 2004). Gender inequality is also reflected in technical and vocational education where girls' participation worldwide was less than 40%.

Significance of Girls' Education

Attention to girls' education is desirable for both intrinsic and extrinsic reasons. First, education is worth pursuing for its own sake and has intrinsic value for humans (Sen, 1999). At the most minimum level, education provides literacy – being able to read, write, and do arithmetic – and at the higher levels, education provides opportunities to explore the heights of human cognitive attainment. Perhaps most importantly, as David Carr (2003) has noted, knowledge, understanding, and skill are *constitutive* elements of personhood and so education is a necessary pursuit for both boys and girls, as well as human kind broadly.

Beyond the intrinsic value of education, however, girls' education plays a direct role in poverty reduction and economic growth by enhancing girls' ability to take advantage of income generation opportunities (Dollar & Gatti, 1999; Psacharopoulos & Patrinos, 2002; Shultz, 2002). Furthermore, the benefits of education are not just limited to the girls who receive education. Through its impact on wage employment and higher

earnings, education of girls has inter-generational benefits, such as educated mothers give birth to healthier children (Mehmed, 2011; Lee, Asian Development Bank, & Comparative Education Research Centre, 2002), are more likely to send their children to school (Lee et al., 2002), and more likely to have an influence on children's lifestyle choices, including decisions about marriage, sex and fertility, than uneducated mothers (Kaushal, 2014).

Gaps and Need for Study

Despite the widely acknowledged significance of girls' education internationally, gaps between the genders persist, especially in India. The problems of India's education in terms of access and outcomes are well known both in India and in the international community (see Government of India, 2005; United Nations, 2009; Vivek & Dar, 2006).

In addition to the gender disparities for school attendance in India, learning and achievement levels fall significantly short of international averages for those who are enrolled in school (UNESCO, 2006). Student achievement at primary and secondary school levels compare poorly with many nations (IEG, 2006). In India, national surveys reveal that only one-third of children in grade 5 can perform long division, and one-third cannot perform two-digit subtraction (ASER, 2011). Other studies show that a little more than a quarter of Indian children who complete primary school can read a simple passage, perform division, tell time, and handle money, although students should have mastered these skills by the end of the second year of school (Pritchett, 2013). Girls have even poorer learning levels because of inadequate attendance, a lack of time spent on learning, or prematurely dropping out from schools, among other reasons (Kingdon, 2002; Pritchett, 2013; Pritchett, Banerji, & Kenny, 2013). However, findings from the recent

National Achievement Surveys have documented an upward trend in learning levels of both boys and girls (National University of Educational Planning and Administration, 2014).

There are significant inadequacies in development practice as well. The dominant framework for development practice and for understanding human well-being in the context of international development has been based on neoliberal economics (Deneulin, Nebel & Sagovsky, 2006; Klees, 2008). While neither human well-being nor equality are direct concerns of neoliberalism (Coburn, 2004), and while many argue that neoliberalism itself may endorse and engender much of the inequality both within and across countries (Harvey, 2003; 2005; Klees, 2008; Wade, 2004), due to its extant prominence, this framework is used to assess and understand human well-being in international development. Neoliberalism is applied to assess levels of utility and thus, it is argued, it assesses at least an aspect of human well-being, by examining such things as income and/or the guarantee of primary goods. That is, when neoliberalism is applied to international development, the understanding of well-being is that the greater the equality in earned income and/or guarantee of primary goods the greater human well-being.

The problem of understanding human well-being solely in terms of primary goods, such as basic rights and liberties, income, wealth, and social bases of self-respect, is that the point of development according to this framework becomes equality of goods for all. However, equality of goods for all may not be the most appropriate goal for human development because, when arguing for the equality of goods for all, this approach fails to note the diversity of human beings in terms of their physical traits, talents, and circumstances, and most importantly, the diverse ways in which individuals

are able to convert these goods to what they truly value. So equalizing rights or the amount of primary goods between an able-bodied person and a disabled person ignores the fact that the latter might not be able to leverage his/her rights or would require more material and social resources to be able to be healthy, mobile, and to be able to fare well in society, including overcoming social biases against disability (Sen, 1980).[2]

When this neoliberal resource-focused framework is applied to education, efforts have often focused only on available goods or resources for education or economic outcomes expected through investment in education (Unterhalter, Vaughan, & Walker, 2007). However, merely focusing on resources and inputs of education is restrictive and insufficient to explain the significance of education, per se, as well as issues such as the disparities between girls and boys on various educational indicators (Unterhalter, Vaughan, & Walker, 2007). The inadequacy of the neoliberal framework stems from the fact that when education is examined only in terms of available resources or resultant outcomes, the objective becomes determining those inputs in education that would benefit the aggregate, without regard to the inherent diversity in personal abilities, social circumstances within school-aged children, and the different ways in which individual children can convert the same inputs into what they value for themselves due to different distribution of opportunities within and among various societal forms of organizations (e.g., countries, districts, families, etc.). For example, investing in girls' and women's education is justified by its benefits not necessarily for the girls or women themselves, but for the societies in which they live. And that structural inequalities for girls in

[2] See Robeyns (2005) for the diversity of factors that explain differences in conversion from goods to freedoms/functionings.

education are only of interest in so far as they need to be addressed to ensure benefits for the aggregate population (Brighouse & Unterhalter, 2010).

Another significant inadequacy of the neoliberal framework stems from the "superficial representation" of the problem of inequality in education, whereby inequality in education is a "Human Capital" concern and is represented as merely a lack of access to resources or services (Molla, 2014, p. 10). This superficial representation of the problem results in a lack of focus on structural causes—cultural norms, policies or discriminatory practices— that are significant in education.

To understand why gender inequalities persist we must look at not just whether learners have access to resources but also whether they are able to convert the resources available to them into enrollment, attendance, or learning levels—and, most basically—valuable freedoms and functionings. Learners need to have resources available but also need to be *free* and *able* to convert these resources into personal and economic growth. Critical factors that mediate this conversion are social, economic, or political opportunities available to learners. For instance, a girl may be enrolled in school, so has access to schooling but community violence and safety issues affect her being able to go to school. Therefore, she is limited in her freedom and ability to convert her enrollment in school into learning. Similarly, a girl may be enrolled in school but sibling care or household chores prevent her from attending school regularly.

Opportunities to access the various resources are necessary and perhaps a prerequisite to enable enrollment, attendance, and completion in school for girls as well as to enhance learning levels in reading, arithmetic and writing. Such abilities or opportunities are "capabilities" and to ensure gender equality in education, we must strive

to ensure equal capabilities to convert the resources into desirable educational outcomes (Sen, 1993).

Although past studies on girls' education in developing contexts have also focused on differences between girls and boys, studies have primarily talked about these differences in terms of distributive explanations that mask inequities in capabilities or effective opportunities due to social structures or norms (see Kingdon, 2010; Kingdon & Theopold, 2006). That is, the differences between boys and girls on educational participation and performance have been explained as a consequence of differences in input variables such as household income, socioeconomic status, childhood malnutrition, and other covariates such as mother's education, caste, and religion. However, examinations of education in resource or input terms is problematic for several reasons. A focus on assessing education in resource terms neglects the structural causes or institutional environments that are the root of the inequities in inputs in the first place. Also, such examinations ignore social arrangements that favor certain groups over others, and, which in turn, reinforce the inequalities between those same groups. And finally, such examinations fail to identify ways these structural causes can be addressed through changes in policies and practices. Another problem with resource based approaches to assessing education is their failure to attend to the fact that the same resource can have radically different results with different students, given different conversion factors.

Given the gender disparities in India and the limits of neoliberal resource-based approaches to understanding education in developing societies, there is a need for re-engagement with the issue of girls' education. In the following chapters, I present my study on girls' education in India using hierarchical linear modeling (HLM). HLM is a

powerful quantitative tool that permits disentangling group and individual effects. This study focuses on the role of effective opportunities—or in terms of the Capability Approach, capabilities—in increasing the likelihood of achieved functioning in education.[3] That is, this study examines capabilities at the district levels and how these capabilities (or effective opportunities) are related to achievement of education-related functionings of reading, arithmetic, and writing proficiencies, particularly with respect to differences between girls and boys at the primary level.

Overview of the Study

In the remainder of this chapter, I discuss the conceptual framework – the Capability Approach – that provides the backbone and in part, the thrust of this study, and three central research questions that guide the study. Then I describe the data used for examining these questions, and the advantages and limitations of using them. I also describe the analytical methods that I employed in this study.

This study is based on a conceptual framework that stems from the Capability Approach (CA) put forth by Amartya Sen (1999) and uses capabilities listed by Nussbaum (2000). CA is a normative framework that may be used to assess issues related to poverty, quality of life, living standards, or well-being in international development. CA encompasses assessment of both *individual* situations and trajectories, and *social* structures and arrangements.

The central thrust of CA is development as an endeavor of expanding human freedoms. CA argues that the expansion of these freedoms should be the primary focus rather than the common development targets such as the growth of gross national product, personal incomes, industrialization, technological advancement, or social

[3]Capabilities are not just the means but – along with functionings – are the ends of education.

modernization. According to Sen (1999), the theory's focus on expanding freedoms directs attention to the ends that make development significant, rather than to some means that play an important role in the process of development. That is, the notion of development as freedom entails understanding that the freedom of political participation or opportunity to receive basic education and health care are constituent components of development itself.

Furthermore, according to CA, in addition to being the primary end of development, expansion of human freedoms also has an instrumental role in promoting development. That is, human freedoms are also the "…*principal means* of development" (Sen, 1999, p. 36). The instrumental role of freedom concerns the way different rights, opportunities, and entitlements interact with one another such that freedom of one type contributes to expansion of freedom of other types and thus promotes development. Sen identifies at least five types of instrumental freedoms: (a) political freedoms, which entail the opportunities people have to influence government, as well as political entitlements to free press, dialogue, dissent, and scrutiny, the choice between political parties and so on; (b) economic facilities, which include the opportunities that people have to utilize economic resources for the purpose of consumption, production, or exchange; (c) social opportunities, which refer to "the arrangements that society makes such as education or health care that enable the attainment of a better life and more effective economic and political participation" (Sen, 1999, p. 36); (d) transparency guarantees, which include the prevention of corruption and financial irresponsibility, as well as the creation of factors that enable trust so that individuals and social groups can enter into transactions under guarantees of disclosure and openness; and (e) protective security, which refers to the

social safety nets, such as unemployment benefits or famine relief that prevent individuals from being reduced to poverty, starvation, or death.

These instrumental freedoms directly and indirectly contribute to enhancing people's functionings and capabilities. Functionings are what Sen (1999) calls "the various things a person may value being and doing" (p. 75). Examples include being healthy, adequately nourished, happy, and safe; having an education, a good job, or participating in the political and social life of the community (Sen, 1992, 1999). Functionings are related to goods and income, in so much as the goods and income are the means to individual achievements. For example, when an individual uses her income to pay for an education, she enjoys the *functioning* of being educated. Functionings are aspects of human well-being and range from the very basic ones related to survival (being nourished, clothed, literate) to quite complex ones related to self-realization or accomplishments in arts and culture (leading a community group).

A related concept is that of capabilities. Sen (1999) refers to them as "the alternative combinations of functionings (beings and doings) that are feasible for one to achieve" or the "ability to" do something (p. 75). Capability then reflects an individual's real freedoms or effective opportunities to achieve alternative combinations of functionings at a given point in time. For example, if an individual can use the household income to attend school but her health does not permit her to attend school regularly or she is in danger of being assaulted in her community she does not have an effective opportunity or the *capability* of being educated. A person, then, with many capabilities (many effective opportunities) can pursue many different activities and life paths. So even though a person is not actually being educated at a point in time, it is valuable for

her to have the opportunity or freedom to be educated, assuming she can effectively leverage the opportunity at a later time.

But not every opportunity is a capability. Capabilities include only those possibilities that people really have a "reason to value" (Sen, 1992, p. 81). For instance, it can be argued that it is more valuable that a young girl is safe and has access to a school than that she can choose between rival brands of a product, so that the possibilities or opportunities of being safe and having access to education would be called capabilities but not the choice between two brands of a product. Although a girl may value the choice between two brands of a product, according to Sen, the discussion should be focused on intrinsically valued activities rather than commodities or resources, which are only imperfect proxies for meaningful opportunities to attain intrinsically valued functionings.

The capability set of an individual depends on her entitlements and commodities (the goods and services available to her) and on her ability to convert them into valuable functionings. Figure 1 illustrates that having access to commodities only acts as a means to achieve but does not guarantee the achievement of a functioning or well-being. For instance, a family having enough money to be able to afford children's schooling does not guarantee that girls in that family will be sent to school. The money is only a means to some ends (e.g., affording nutrition or shelter). If the functioning of being educated requires the possession of some money, it also requires the ability of being able to convert this means into a functioning. It is here that capabilities influence the conversion of commodities into functionings.

But what capabilities should comprise an individual's capability set? Although there is some indication in Sen's writings regarding selecting capabilities, Sen largely refrains from identifying a specific set, though he provides many examples of individual capabilities. According to Sen, the actual set of valued capabilities depends on situated values. These values will vary among individuals within a society and among individuals between societies. Thus, determining which capabilities are central or essential rights ought to be resolved through democratic deliberation and debate. In other words, determining which capabilities really matter ought to be a collective and context dependent decision.

Martha Nussbaum (2000) has argued, however, that some human capabilities can be identified and used to provide the basis for "constitutional principles that should be respected and implemented by the governments of all nations (p. 5)." She has proposed ten capabilities – life, bodily health, bodily integrity, senses, imagination and thought (related to education or being able to use one's mind), emotions, practical reason, affiliation, other species (related to nature and the environment), play, and control over one's environment – that she argues can be said to be universally valued. These "constitutional principles" notwithstanding, Sen (1999) and Crocker (2006) argue that capabilities ought to be selected through critical reflection and deliberation by communities or researchers based on (a) direct exploration of which capabilities people value and attach a high premium to and (b) exploration of which capabilities are relevant to the policy, project, or institution under consideration (Sen, 1999).

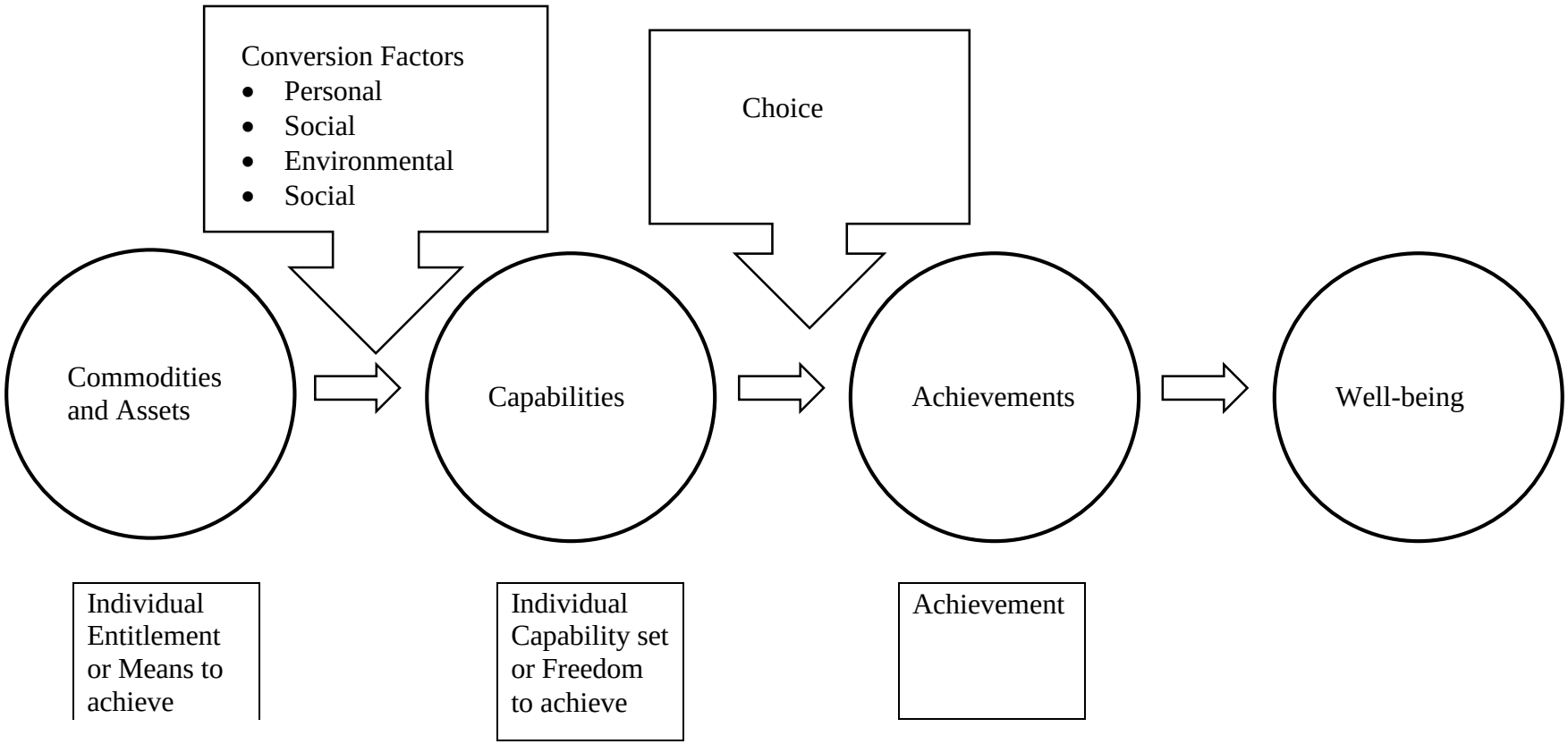

Figure 1.1. Relationship between commodities, functionings, capabilities and well-being

CA thus places an individual at the center of its framework and argues that individuals, and only individuals, are the *ultimate* units of development concern (Robeyns, 2008). For too long alternative units of development such as the family, the social group, or the community have overlooked the disparities between individuals within these units, such as the disparities within families between men, women, and children.

CA's forte as a framework lies in its flexibility and the possibility of pluralistic conceptions regarding the basic tenets – a strength that allows researchers and practitioners to develop and apply the framework in different ways (Alkire, 2002a). Clark (2005) has identified several strengths of CA. First, related to the above point, because Sen does not subscribe to a definitive list of capabilities, CA can be used to evaluate a range of issues in development. For example, poverty may require a smaller subset of capabilities, such as capabilities pertaining to the essentials of survival – housing, food, water and health. Well-being, on the other hand, may require a greater number and more diverse options of capabilities, such as capabilities ranging from the basic necessities to those related to self-actualization. Moreover, CA (a) refocuses attention on the individual as the end of development (instead of just as means to economic growth); (b) recognizes human diversity based on the differences that people have to convert capabilities into functionings (due to disability, age, gender, climactic circumstances, social conditions, conventions, and family distributional rules); (c) acknowledges the role of human action and agency (by emphasizing the place of deliberative democracy, active choices, and policy decisions in development); and (d) allows that different people and societies may have different values, priorities, and goals.

At the same time that CA promises to be a useful lens for examining issues in development, researchers have to contend with several challenges related to the framework. In addition to the problem of *which capabilities* are important to be studied, is the problem of how to measure capabilities, and how to clearly distinguish between capabilities and functionings in a given context (Walby, 2012). In this way, the framework's flexibility is also a weakness or potential shortcoming for researchers and policymakers. Without a standard set of capabilities or functionings, or greater conceptual clarity, researchers must operationalize these concepts, often with imperfect data.

Despite the challenges, CA has much to offer normatively, theoretically, and empirically with regard to redefining issues in development. In this study, I use the concepts of capabilities and functionings to examine how individual and district characteristics impact girls' schooling in 500 districts in India. I examine the influence of variables that I believe tap important dimensions of capabilities for girls and women at the household and village levels, such as assessments of the likelihood of girls and women being assaulted in their villages. I then aggregate these characteristics across reporting households to the district level as a measure of contextual capabilities (e.g., average assessment about the likelihood of girls and women being assaulted) to determine whether these broader structures of capability influence girls' education functionings of reading, arithmetic, and writing proficiency levels.

Research Focus and Questions

The research questions are multilevel. This is consistent with the view that capabilities are characteristic of individuals as well as higher levels of human

organization such as villages, districts, states, or nations (see Robeyns, 2008, for a more fully developed argument). I use a multilevel analysis method, specifically hierarchical linear modeling (HLM) (Raudenbush & Bryk, 2002). The dataset is the 2005 India Human Development Survey (Desai, S., Vanneman, R., & National Council of Applied Economic Research, 2005). Its purpose was to document a wide range of human development indicators in India, including income, types of work, health, political participation, education, and gender relations. I used HLM to examine the following three research questions:

1. To what extent are there gender differences between children in education functionings as measured by reading, arithmetic, and writing proficiency levels?
2. Does the relationship between gender and education functionings as measured by reading, arithmetic, and writing proficiency levels vary across districts?
3. Can gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels be explained by variation in the contextual capabilities across districts?

The first research question involves the estimation of a Level-1 model. Here, I investigated the characteristics of individual children that are associated with different levels of proficiency in reading, arithmetic, and writing proficiency levels. My primary interest was to determine whether there are differences in proficiency levels for boys and girls after controlling for individual capabilities and other demographic factors. The second research question is an extension of the first model, in which I seek to determine whether any gender differences vary as a function of the districts in which girls and boys

live. My primary interest was to determine whether the estimates of gender differences in proficiency are larger in some districts than others. The third research question estimates districts' contextual effects through a Level-2 model. At this level, the education functionings (reading, arithmetic, and writing proficiency), adjusted for children's characteristics included in the Level-1 model, were explored as a function of districts' characteristics, primarily contextual capabilities. Although my primary interest was to determine whether district-level structures of capability influence the magnitude of gender differences in proficiency levels within districts (the degree of inequality), I also examined whether district-level structures of capacity influence average proficiency levels for all children, regardless of gender.

Methodology

This study takes a quantitative approach by conducting a secondary data analysis utilizing data from the India Human Development Survey (IHDS; Desai et al., 2005). The dataset was sponsored by the National Science Foundation (NSF) and consists of human development data from approximately 40,000 households in India. It utilized a complex sampling design to create a nationally representative sample of households at the time of data collection (Desai, Dubey, Joshi, Sen, Shariff, & Vanneman, 2007). The IHDS collected data directly from the eligible woman in the household and the children in the household, in the year 2005, through two (2) one-hour interviews in each household. The interviews covered a range of development-related topics including economic status, employment, health, and education. The interviews also included unique socially relevant topics such as marriage, fertility, social/political participation, and gender relations as well as beliefs and perceptions about children's education (Desai et al., 2007).

To answer the research questions, I used hierarchical linear modeling (HLM) to explore the extent to which capabilities at the district-level in India appear to affect estimates of primary-school-aged children's outcomes. Student outcomes for analysis include reading proficiency, arithmetic proficiency, and writing proficiency. Student-level characteristics include gender— the primary variable of interest—and other demographic characteristics (e.g., age, religion and caste), household characteristics (e.g., family size, household assets, and highest level of educational attainment for adult women in the family); and educational experiences (e.g., child currently enrolled in school, child enjoys school, teacher usually present, grade level, and ever repeated a grade). District-level characteristics include six contextual capabilities (e.g., measures of life, bodily health, bodily integrity, education, affiliation, and political empowerment). I also include in these models a measure of average household assets in districts as a control.

The analytic sample for the study includes 11,345 primary school-aged children (ages 8-11) and their households located in 500 districts of India. To construct the measures of contextual capabilities I use data from all of the households in the dataset, approximately 40,000 households in India. Because of known differences between the educational experiences of girls in rural and urban settings, I examine each model for rural and urban districts separately.

Significance of Study

The present study makes significant empirical contributions to the literature on gender equity in education and capabilities research. This study also has implications about methodological possibilities of measuring capabilities as well as the

operationalization of CA with respect to girls' education in India. From the perspective of this study, it is not enough to ensure resources or inputs. Rather, studies should also consider the impact of freedoms or capabilities on children's education functionings.

The issue of equity in Indian education, particularly with regard to girls' education, is a fundamental yet severely under-researched issue. As global efforts intensify to meet the Millennium Development Goals (MDGs), the paucity of empirical evidence on the distribution of capabilities and educational opportunities leaves the process of achieving the MDGs and thus educational functionings uninformed by development studies.

Moreover, as previously mentioned, most studies on girls' education focus on the instrumental effects of education (mainly economic or income benefits) for individuals or the supposed accumulative effects for the countries in which they live. While the instrumental benefits of education should not be over looked, they are not the only issues that need to be examined, especially when multiple benefits can accrue from education beyond its ability to raise household incomes.

CA has been significant in changing definitions of assessing individual and regional development by moving the discussion away from individuals' access to resources to the effective opportunities they have to pursue valued states of being and doing. By examining the status of girls' education and using the underpinnings of CA, this study aims to understand the gender gap in education in India, which exists despite the increased financial investments and international emphasis on the matter. The study will provide an empirical investigation of the role of capabilities afforded to girls by households and states in the achievement of education functionings.

While CA broadens the palette of interest in international development and education, it is a new framework that requires additional specifications for its use and application (Alexander, 2008). The present study also operationalizes and specifies some aspects of CA[4] as they apply to the realm of education in a developing country by providing an approach to understanding related capabilities and education functionings.

Limitations of the Study

The limitations of this study pertain to the difficulties of the principle conceptual framework – capabilities and the capability approach – and the shortcomings associated with quantitative secondary analyses. Capabilities or 'effective opportunities' are hard to define and significantly harder to measure. There is a problem not only in operationalizing their examination but also in determining the 'complete' universe of capabilities and their relative significance for functionings and, in turn, well-being. The definition of capability in this study is necessarily limited to the variables available in the IHDS dataset (Desai, et al., 2005). This study is thus limited in being able to fully examine and represent empirically the construct of capability. Nonetheless, significant work is being conducted in operationalizing and measuring capabilities, functionings and agency (see Alkire & Foster, 2011; Anand, Santos, & Smith, 2007; Robeyns, 2005), this study contributes to this work and provides a strategy for addressing some of the challenges associated with operationalizing and measuring some key aspects of CA.

Shortcomings of quantitative secondary analyses include issues of measurement. Especially with a general-purpose survey, it may be impossible to operationalize some constructs with the existing data while other constructs may have robust proxies available to the researcher. To elaborate, the construct of "agency" is an important part of the

[4] A significant part of Sen's (1999) work focuses on agency. This is not directly studied in this dissertation.

capability approach; however, the present study is unable to examine this construct due to lack of an appropriate measure in the dataset. Further, the data used in this study were not designed using CA or designed to test central tenets of CA, even if the data provide sufficiently proxies for some of CA's central constructs. For example, in the IHDS students' reading, arithmetic, and writing mastery is measured by proficiency levels. While these measures are not based on the construct of functioning, they provide a reasonable measure of children's proficiency for a set of important educational outcomes for children within a certain age range, regardless of their language or whether they were enrolled or were not enrolled in school at the time.

Other possible concerns of secondary analyses include issues of generalizability of findings. Although the data are from a representative sample of India, the present study was based on a subsample of households with children between the ages 8-11 years. It is not a random sample of children; rather, it is a random sample of households. Missing data for key variables, such as the outcome measures, may also influence generalizability to other samples, although as I will discuss in Chapter 3, there is little evidence that missing data has skewed the survey's intended sample. Overall, the study provides reasonable estimates of gender differences in proficiency levels in India, even though a random sample of children rather than households would be desirable.

Finally, although the present study incorporated several child/household-level and district-level variables, other critical determinants of education functioning such as more detailed variables pertaining to school environment, classroom experiences, teacher quality and teacher-student activities were not included in the analysis. Although the study may not provide a complete picture of capabilities and impact of education

functioning, this study provides a meaningful picture of the proximal household/district-level characteristics that contribute to girls' education functionings. I revisit these limitations in the methodology section of this dissertation.

Conclusion

This study's purpose is to examine the role of capabilities or effective opportunities in girls' education. This study is designed to meet this goal by operationalizing capabilities and studying their influence on girls' reading, arithmetic, and writing proficiency levels in India. Chapter 2 presents a review of the relevant literature regarding this topic and Chapter 3 more fully describes the methodology that guides this study. Chapter 4 presents the results of the descriptive analyses and the hierarchical linear models while Chapter 5 discusses the results of the study, the limitations, and future directions.

CHAPTER 2: THEORETICAL GROUNDING

This chapter provides the theoretical and empirical grounding for the present study. I begin by providing four theories or approaches that have guided and informed research and fieldwork in international girls' education: (a) the Women in Development (WID) perspective, (b) Human Capital Theory (HCT), (c) the Gender and Development (GAD) perspective, and (d) the Capability Approach (CA).[5] Following a description and critique of each of the four approaches, I delve deeper into CA, which undergirds the present study, comparing CA with HCT. Next, I extend my discussion of CA's strengths and weaknesses, and I operationalize the under-specified framework of CA as it will be applied to understand girls' education in India. Finally, I provide a brief conclusion of some key ideas presented in this chapter.

In this section I present and critique the major theoretical frameworks that inform this study, particularly the Capabilities Approach. The order of presentation of the theories is semi-historical, although the popularity and applications of the approaches have often been concurrent.

Women in Development (WID)

According to Bandarage (1984), "WID is a distinct blend of liberal feminism and the modernization perspective" (p. 496). To understand the contributions and emergence of the WID perspective, therefore, we must (a) understand Modernization Theory – the theory of development that informed Western interventions in newly decolonized and developing contexts – and (b) the theories and research that emerged during the first wave of feminism. I describe the two below.

Description and impact.

[5] See also Todaro & Smith (2014) for the standard account of the evolution of development theory.

In the aftermath of decolonization, an experience that left most colonies impoverished, Western political and intellectual elites sought to create economic growth in newly formed countries (Tipps, 1973). The transformation from a traditional society to a modern one was facilitated along the lines of the historical experience of what is sometimes referred to as First World countries (Inglehart, 1997; Preston,1996). The assumptions of modernization, therefore, were that poverty would be eradicated through the process of industrialization and that newly formed countries would evolve into stable societies (Lipset, 1959). That is, industrialization would expand employment, increase incomes, and would eradicate poverty and its related social issues through the economic growth spurred by the process and the trickle-down effects of successful capitalism (Stewart, 1985; Streeten, Burki, ul Haq, Hicks, & Stewart, 1981). Within the Modernization Theory framework, developing regions and people living in these regions were treated monolithically such that differences between developing contexts or groups of people were ignored (Geertz, 1963; Kuper & Smith, 1969; Tipps, 1973). Further, development and its benefits were regarded to be "systemic" and assumed to be distributed equally among the various groups (Tipps, 1973, p. 202).

The contrasting force of American liberal feminism, in which societies were no longer considered homogenous, was emerging at the same time, and women's issues began gaining prominence in the international arena (Rathgeber, 1990). The primary emphasis of feminism at this point was to increase women's status by eliminating inequalities between men and women through egalitarian policies. In this context, Ester Boserup was the first to systematically examine the variable of gender in development (Beneria & Sen, 1981; Rathgeber, 1990). In her landmark research publication *Women's*

Role in Economic Development, Boserup (1970) studied the differential effects of modernization on women and delineated the global sexual division of labor in agrarian economies.

Boserup (1970) found that women tended to do the majority of agricultural work in sparsely populated regions where shifting agriculture was practiced – that is, where plots of land are cultivated temporarily and then abandoned until fertility returns naturally. These "female farming systems" were characterized by the use of simple technologies like the hoe and communal farming. They were also characterized by polygyny (men with multiple wives) and bride price. Polygyny allowed women to take on work burdens associated with both agriculture and child rearing while bride price valued women as men paid the bride's family to compensate for its loss and trade. Women experienced considerable geographic mobility and had status as workers and mothers (Boserup, 1970).

Conversely, in more densely populated regions where technologies like the plow were used men did more of the agricultural work. In these "male farming systems" (characterized by use of the plow on private, fixed plots of land often by hired help) women were often confined to their homes and monitored by male kin. Boserup's (1970) research demonstrated that improved technology and changes in farming practices lowered women's status in these regions by reducing their access to productive work.

In other words, Boserup clearly demonstrated that changes in traditional agricultural practices toward more modern ones differentially impacted the work done by men and women. In these more modern sectors, there were fewer jobs available for women and sex stereotyping was more prevalent (Tinker, 1990). Boserup's research and

the WID perspective brought into relief the tendency of development initiatives to ignore women's perspectives, experiences, and needs in the planning process and implementation of development policy (Diaw, 2002).

Even though women were the focus of WID, this perspective was not initially directed toward promoting education. Rather, WID was directed toward enhancing women's income-generating capabilities and almost exclusively focused on women's productive roles. In this regard, work through the WID perspective was successful in raising awareness and directing some resources to women from development programs (Diaw, 2002).

In the broader context of development, when applied to women's equality in education, the WID perspective was translated into increasing access to education for girls and women and closing the gender gap in enrollment and investment in girls' education (Unterhalter, 2000). However, WID's call for better education for girls was done for the purposes of increasing economic productivity (Unterhalter, 2005). The rationale behind promoting a massive expansion of education systems was that access to education would enable women to become better productive agents in the economy and would thus help to move traditional societies into the sphere of modern countries. The focus of education and literacy programs from this perspective shifted from earlier policies that were "gender blind" to specifically targeting girls and women to promote equal opportunity or parity in resources to increase economic productivity (Diaw, 2002; Mannathoko, 2008).

Critique.

The WID approach, dominant from the 1970s to the 1980s, tended to view the existing social structures as given and axiomatic (Rathgeber & Motzafi-Haller, 2007). In

that context, women who were poor or ill-equipped were viewed as victims lacking agency and only seen as possible beneficiaries of development initiatives. The WID approach also tended to treat women as a homogeneous category, despite the approach's promotion of the recognition of a woman's perspective (Razavi & Miller,1995). A key outcome was that women's concerns were viewed in isolation from society and as separate issues from those of men rather than as central development objectives that pertained to human rights and governance (UNESCO, 2002). Thus, women's concerns were marginalized, addressed through "women's projects," which were often added on as after-thoughts to honor commitments to WID and led to little or no change in many regions of the world (Stromquist, 1998).

According to the Commonwealth Plan of Action (1995), the WID approach focused on women's integration into the existing male-oriented world and development initiatives. Further, the approach emphasized women's contributions through productive work to the exclusion of their reproductive work. That is, in the interest of highlighting women as producers and active contributors to the broader economy, the WID perspective underplayed women's significant involvement in child bearing, child rearing, and family care activities and failed to recognize these roles as productive activities in themselves (Beneria & Sen, 1982). This approach, characterized by income-generating projects for women, failed to address the structural causes of gender inequality.

Critics of the WID approach had a growing understanding in the early 1990s that gender equality depended on unrecognized intersections between global forces, gender relations, and development (Beneria & Sen, 1982; Young, Wolkowitz, McCullagh, 1981). To tackle women's equality issues, the focus would need to be re-directed to the

socially defined causes of women's disempowerment, including power relations between men and women (Kerr, 2002). While the focus on women as productive agents in global economics was one of WID's significant contributions and strengths, WID's exclusive focus on women's economic productivity ignored the other roles that women play, including roles of reproduction and caring for the needs of their children and families (Beneria & Sen, 1982).

Human Capital Theory (HCT)

WID's focus on economic productivity dovetailed with that of another significant development perspective – Human Capital Theory. Stemming from neoliberal discourse, education is regarded as an economic instrument of capitalism under which individuals are conceived as units of capital (Fitzsimons, 2000). I discuss this perspective next.

Description and impact.

Human Capital theory (HCT) was pioneered prominently by two University of Chicago economists, Gary Becker and Theodore Schultz in the 1960s (Becker, 1962, 1964; Schultz, 1963). At first ground breaking because of its unique emphasis on humans as agents in an economy, HCT is now well-established in economic theory. Whereas former economic theories focused on increasing economic prosperity through the enhancement of physical capital (e.g., technology), Becker (1962) argued that policies should promote the enhancement of human skills and talents so as to realize greater individual and societal economic prosperity.

Rooted in Modernization Theory,[6] HCT's central assumption is that education is both the instrumental thrust and the necessary ingredient to increase the productivity of a population; as a result, investment in human capital is key to development. HCT also

[6] See Adams, 1971; Carnoy, 1974.

assumes that development is a slow, but steady linear process (Schultz, 1993). Becker (1993) describes investing in human capital as those "activities that influence future monetary and psychic income by increasing the resource in people, including schooling, on-the-job training, medical care, and migration" (p. 11). He argued further that even though the investments in these activities may differ in terms of amount, in their direct effects on consumption and earnings as well as on perceived returns on investments, they all serve to improve skills, knowledge, or health and thus raise levels of income and satisfaction.

HCT has had an immense impact on development and continues to inform development policy to this day. Particularly in development research, HCT has held sway for more than 30 years and has spawned a significant number of claims and beliefs about the importance of human capital in promoting development. Psacharopoulos and Woodhall (1997) succinctly state HCT's contribution to our understanding of development:

> Human resources constitute the ultimate basis of wealth of nations. Capital and natural resources are passive factors of production, human beings are the active agents who accumulate capital, exploit natural resources, build social, economic and political organization, and carry forward national development. (p. 102)

Their view of the central role of human capital theory in development policies is shared by many, though some researchers question whether the supposed benefits of the theory are always realized (Bowles & Gintis, 1975; Benhabib & Spiegel, 1994; Islam, 1995; Ortega & Pritchett, 2014; Tan, 2014).

In a paper that surveyed empirical studies from sociology, demography, economics, political science and anthropology, Hannum and Buchmann (2004) identified and evaluated five strands of research related to the assumptions about the role of human capital in development: (a) human capital is related to national economic development, such that better educated individuals are more productive; (b) the expansion of educational opportunities enables individuals to improve their economic circumstances; (c) educational expansion narrows wage differentials and inequalities within countries by promoting a meritocratic basis for socio-economic status; (d) countries with better educated individuals tend to have healthier and slower growing populations because education enables better health choices and is related to fewer and healthier children; and (e) countries with more educated populations are more democratic. Hannum and Buchmann (2004) found that while there was consistent evidence on the beneficial effects of educational expansion related to health and demographic change in countries, the research was more ambiguous regarding the effects of educational expansion for economic growth, elimination of social inequalities, or democratization.

Even so, in the HCT view of development, education is central in so far as education helps individuals acquire knowledge and create skills (Becker, 1975). These personal forms of capital investment eventually yield increased productivity. Human Capital Theory also invokes concepts of efficiency to justify investment in women's and girls' education even though equality has not been an HCT focus. Not surprisingly, HCT has become the clarion call for international investment in the expansion of education systems (Fagerlind & Saha, 1997). That is, HCT has provided the basic justification for public expenditure on education in both developed and developing countries.

Critique.

Robeyns (2006) has highlighted a number of problems with HCT that have consequences in both developing and industrialized contexts. A significant problem that she has highlighted with HCT is that it is "economistic" (Robeyns, 2006, p. 69) in that benefits are only regarded in terms of increased productivity and higher incomes. Despite the original references to "psychic income," (Becker, 1975, p. 9) the cultural, social and non-material dimensions of human living are largely ignored (Robeyns, 2006).

Extending this critique to education, the benefits of education then are only relevant in so far as they enhance productivity and incomes. Because a central assumption is the primacy of economic benefits in any action (e.g. reading, schooling, health, etc.), HCT struggles to explain behavior that does not yield economic returns. For example, as Robeyns (2006) points out, how would HCT account for an individual studying Latin poetry unless that would result in employment or increased wages in some manner?

Moreover, there is natural or social variation between individuals and groups in a society in the rate of return on investments in education. In other words, given differences in the distribution of resources and opportunities in a society, investments in education are not likely to be the same for different people (Robeyns, 2006). HCT, therefore, fails to provide a rationale or justification for why education should be provided for all members of society. Rather, it tends to argue the opposite – that is, if women have a poor rate of return on education due to family and labor market barriers (such as exclusion or discrimination) then it behooves policy makers to invest more in education for boys (Wigley & Akkoyunlu-Wigley, 2006).

The execution of HCT in international education has translated into an emphasis on enhancing educational opportunities through the expansion of the education system. The focus has been largely on access. However, looking at the provision of resources provides insufficient understanding for how individuals make use of resources—personal and external/structural barriers can prevent appropriate use of resources (Robeyns, 2006). When access and additional resources were provided, HCT could not explain why some children, particularly girls, failed to enroll or attend schools in a consistent manner. Other than providing access and educational resources, HCT has essentially failed to change the nature of educational opportunities for traditionally marginalized groups, especially girls (Alkire, 2002b; Robeyns, 2006).

Another problem of conceiving education as an investment is that it compels us to think of choosing between education and other alternative types of investment to be able to make an optimal choice. Other non-material benefits – such as self-confidence, self-improvement or increase in other freedoms – are disregarded and unaccounted for in such a view. But human capital arguments have held sway because outcomes such as income, wages, GDP, and mortality rates are easy to quantify and study instead of the possible non-material benefits of education (Arends-Kuenning & Amin, 2001). So while human capital is significant, as Sen (1997) has suggested, "we must go beyond the notion of human capital, after acknowledging its relevance and reach" (p. 1960).

Gender and Development Perspective (GAD)

The Gender and Development (GAD) perspective advanced the agenda of gender equality. By the late 1970s, strands of work on women's issues began to question the adequacy of focusing on women in isolation of the social and institutional contexts in

which they lived (Razavi & Miller, 1995). New research began focusing on the role of gender relations and the role of power and conflict in understanding women's status. I discus this perspective next.

Description and impact.

A key component of GAD is the recognition that women's and girls' roles in society are socially and culturally constructed. Moore (1988) argued that while "sex" and "gender" are related constructs, rather than being inherent biological or physiological characteristics, concepts of "maleness" and "femaleness" are social and cultural representations of gender roles that are powerfully reinforced by social activities. Status and power differentials between men and women may not be captured by their respective roles and positions in the economic production framework alone, and one has to consider other gendered power structures to understand status and power differentials. For example, in a study on the effects of mechanization in agriculture on women, Stoler (1977) found that agricultural modernization had a more intensifying effect on class than on sexual exploitation in rural Java. The impact of mechanized rice-hulling, which replaced women's rice-hulling through pounding, was not the same on different classes of women. Women from poorer households and landless women suffered more from income loss and were forced to accept alternative low-paying jobs as a result of mechanization. But women from wealthier households, now free from the tasks of harvest management, had more leisure time.

Stemming from the premise that gender is a social/cultural construction, another focus of GAD research analyzes gender subordination through socially constructed rules and practices in the household, market, state, and community (Razavi & Miller, 1995). GAD scholars focused on gender relations in both the labor force and the reproductive

sphere and avoided universalizing the characteristics of patriarchal oppression, as was done by earlier liberal feminists (Young, 1992).

Mies (1982), in a case study of a substantial household industry in Narsapur, Andhra Pradesh, India, shows how capital engages women's labor in the home for the production of commodities, such as lace for export. By continuing to label these women as "housewives" (p. 52) and their activities as "domestic production," (p. 52) capitalists (e.g. employers, local traders, and exporters) avoid paying fair wages and providing other basic labor rights to the women who produce lace for them. So unlike WID, GAD is skeptical that access to development projects per se would help address the economic and social disadvantages faced by women (Young, 2011). Instead, they emphasize the need for women's organizations and coalitions to increase their political power within the economic system (Young, 2011).

The GAD perspective in education has focused on social constructions of gender and power in the context of schools. The GAD perspective has promoted concepts and methods such as empowerment, gender mainstreaming, gender budgeting, gender auditing, and conscientization. Conscientization refers to the process of creating awareness of the traditions, structures, and institutions that reinforce discrimination and subordination of women as a first step to challenging these obstacles (Kwapong, 2005). Gender budgeting involves the analysis of government budgets for their impacts on women compared to men and to determine to what extent government spending addresses commitments to poverty reduction, social inclusion, and the advancement of women's rights. Gender auditing refers to the assessment of personal and institutional biases in an organization that prevent the achievement of gender equality. Lastly, gender

mainstreaming examines the nature of gender and gender equality, analyzes power relations within society, and takes the power relations into account in framing of development policies (Moser, 2005).

Critique.

The GAD perspective has had a significant impact on development planning, especially in terms of specific tools to incorporate gender into development, such as gender mainstreaming and gender budgeting. Both these approaches, however, face their own set of challenges. For example, it is not always easy to negotiate with government officials to reveal gender-disaggregated data or gender-disaggregated budgetary allocations (Goetz, 1997).

A significant critique of the GAD perspective is that while it enhanced and developed ethical notions about women's equality, the execution of GAD in development initiatives is weak and sometimes non-existent (Dagenais & Piche, 1994; Goetz, 1997). This is because few international agencies or governments are equipped or inclined to take on social structures such as gender relations (Rathgeber, 1990).

Finally, even though GAD questions social constructions of gender roles and the resulting power differentials between men and women, it remains tied to modernist discourses on development that give precedence to "Western expertise" and exaggerate western claims to knowledge (Parpart, 2000; Stromquist, 1990).

Capability Approach (CA)

The Capability Approach (CA) is a normative framework for evaluating human well-being or development that has gained in importance in the last decade in research and practice (Crocker, 1992, 2008; Robeyns, 2005, 2006). At the heart of this approach is the argument that the appropriate metric for evaluating well-being is not resources or

preferences but rather effective opportunities that people have available to them to lead the lives that they have reason to value. I describe this approach next.

Description and impact.

The three main concepts of CA are (a) functionings, (b) capabilities, and (c) agency (Crocker, 2008). Sen (1992) defines functionings as valued states of "beings" or "doings" (p. 40). Sen refrains from providing a definite list of functionings, but valued states of being or doing may include a range of conditions, including the states of being nourished, clothed, sheltered, and educated. Relatedly, the concept of capabilities refers to a set of alternative functionings that are possible. The concept of capabilities captures the notion of "real" opportunities available to people to be able to be or do something, given their social identities and sense of "…freedom – the range of options a person has in deciding what kind of life to lead" (Drèze & Sen, 1995, p. 10). The distinction between functioning and capabilities is between achievements and the various opportunities for valuable options (Robeyns, 2006). What is ultimately important is that people have the freedoms or opportunities (i.e. capabilities) to lead the kind of lives they value or want to lead. In this way, capabilities have a greater significance than functionings. Finally, in addition to capability and functioning, the CA framework refers to agency or the capacity of humans to be active agents in their well-being rather than being mere passive recipients or victims.

The capability approach primarily concerns itself with development as it impacts people's capabilities. Robeyns (2005) describes the focus of CA:

> It asks whether people are being healthy, and whether the means or resources necessary for this capability are present, such as clean water, access to doctors, protection from infections and diseases, and basic knowledge on health issues. It

> asks whether people are well-nourished, and whether the conditions for this capability, such as having sufficient food supplies and food entitlements, are being met. It asks whether people have access to a high-quality educational system, to real political participation, to community activities that support them to cope with struggles in daily life and that foster real friendships. For some of these capabilities, the main input will be financial resources and economic production, but for others it can also be political practices and institutions, such as the effective guaranteeing and protection of freedom of thought, political participation, social or cultural practices, social structures, social institutions, public goods, social norms, traditions and habits. The capability approach thus covers all dimensions of human well-being (p. 3-4).

CA's appeal, therefore, lies not just in the fact that it is a multidimensional framework for understanding poverty, development, and well-being but also because its richness allows a deeper understanding of the inter-related layers of social influences that impact well-being and yet are understudied due to the inadequate frameworks of other theoretical perspectives (Chiappero-Martinetti, 2005).

Critique.

As with all theories, the strengths of a theory may also be its weaknesses. The flexibility of CA is a major strength of the framework and yet a significant weakness. Even though CA suggests that the appropriate informational bases to evaluate equality are not simply resources, preferences, or functionings but rather capabilities, the approach fails to specify the measurement of capabilities, which are by definition an extensive range of differential opportunities. For example, the capability of *being healthy* for a young girl may involve a different set of opportunities as compared to those for being

healthy for a young boy. Similarly, each individual's set of capabilities may be different from another individual's making the issue of capability measurement either complex (if every individual's capabilities are considered) or arbitrary (if the capabilities considered are limited by some criteria).

Another problem that researchers have identified with CA relates to methodological issues in terms of (a) description, (b) aggregation, and (c) inference (Chiappero-Martinetti, 2005). In empirical and quantitative applications of CA, methodological issues exist associated with measuring more nuanced conceptualizations of deprivation and well-being. Rather than treat these constructs as dichotomous phenomena, researchers are encouraged to treat these constructs as continuous and dependent on other factors (e.g., individual preference). Such complexity is difficult to operationalize in a study. But being the newest of all four formulations, CA is still an evolving school of thought and its full impact on gender and development is yet to be realized.

Comparative Analysis

Of the four perspectives discussed, the Human Capital Theory developed by Becker has been the theory of choice since the 1960s in the field of development and international education and economics. HCT has been applied to activities related to improving human living conditions or international development in the areas of poverty alleviation, discrimination, marriage, family relations, and education. As a result of its wide usage, HCT is better operationalized than CA (Becker, 1962, 1975, 1993; Schultz, 1961). This study, though, recognizes some serious limitations to HCT and as such utilizes Sen's Capability Approach.

The general premise in the application of the Human Capital Theory is that individuals maximize their well-being as they accumulate human capital over their lifetime. Well-being is often considered to be synonymous with income earnings. Additionally, differences in well-being or income earnings among individuals, regions, or time periods are considered to result not just from "…differences in physical capital, technological knowledge, ability, or institutions (such as unionization or socialized production)" but also from investments in human capital (Becker, 1993, p. 95). According to researchers such as Schultz (1961), investments in human capital account for most of the rise in national outputs in Western countries.

But a significant argument for using CA in discussing issues of equality, poverty, and well-being is that the capability approach emphasizes the intrinsic value of various functionings and abilities and "…is not merely concerned with skills which are of instrumental use" (Alkire, Qizilbash & Comim, 2008, p. 14). That is, investments in education, health, and other non-schooling investments are important not only because they contribute to human capital and thus national outputs but also because these functionings are important in themselves.

Another reason to use the CA approach in discussing education issues at national levels is that when equality, poverty, or well-being are understood in terms of capability or functionings, a multi-dimensional measurement of these issues becomes possible. That is, equality, poverty, or well-being can be evaluated using a greater number and broader set of indicators (e.g., social networks, political participation, morbidity, functional literacy, health and nutrition, and gender relations) than just income indicators. Income, in the CA framework, is seen as having *instrumental value* – value as a means to

realization of other ends but not as a dimension of well-being itself. For example, the Gender Inequality Index (GII), which was developed by the United Nations Development Program (UNDP), measures inequality in achievements between women and men based on multiple-indicators of joint significance including reproductive health, empowerment, and the labor market. From the perspective of Human Capital Theory, the primary indicators between women and men would be measures (e.g. knowledge, education, skill, training, or experience) that tap into differences in the potential or actual income generation of women and men. The Human Capital Theory thus fails to adequately describe structural inequalities.

The CA approach also provides a better framework to measure individual well-being because it focuses on the individual as the ultimate unit for evaluating development. Aggregate preferences of members that comprise social units, such as households, can be misleading if they fail to represent individual preferences and instead obscure intra-household inequalities that usually tend to disadvantage the weakest members of the social unit (Sen, 1992).

Challenges of CA

While CA provides an opportunity to expand ideas of well-being, there are some challenges in operationalizing the perspective (Clark, 2005). The practical difficulties described in this section include the following: (a) high demand for information, (b) the theoretical under-specification of CA, (c) the tension between the individual and society, and (d) measurement of and distinction between capabilities and functionings.

Although CA broadens practitioners' understanding of development and deprivation, CA encourages using information that cannot easily be translated into

concrete metrics or has a higher demand for information for evaluating development and deprivation (Sugden, 1993). For instance, CA talks about constructs of democracy and freedom in abstract terms without translating these terms into constructs with concrete meanings (Comim, 2008). When evaluating inequality, CA encourages replacing measures of development from measures of gross domestic product (GDP) and gross national product (GNP) based on relatively accessible income variables, with measures such as the Human Development Index (HDI) and Gender Equity Index (GEI), which are based on more complex combinations of data that are more difficult to acquire (e.g., average life expectancy, health, educational levels). Moreover, average life expectancy, health, and educational levels are heterogeneous concepts in themselves. That is, as heterogeneous entities they have different units of measurement, and thus, are hard to combine into a single indicator.

Furthermore, being theoretically under-specified, CA provides no indications of how these recommended broader sources of information are to be combined or sequenced to make normative evaluations (Comim, 2008). It is the result of CA's "…bottom-up nature that requires participation and involvement of those people who are the agents of development change" (Comim, 2008, p. 160). But, this is a significant empirical challenge. To perform a study in capabilities, a researcher must first identify relevant capabilities, however, desirable capabilities may vary among individuals. The issue of selecting capabilities is not a simple one. Relevant capabilities relate to normative questions of *whose* and *which capabilities*, but also represent a practical concern given that many capabilities can be used to account for and explain well-being.

Part of the uncertainty about which capabilities are relevant stems from the nature of the CA framework. Sen (1993) rejects having a pre-specified list of capabilities autocratically identified by a person, researcher, or group. Rather, Sen suggests that the process of identifying capabilities ought to be defined through deliberative democratic processes by the relevant groups themselves, thus bringing to bear the important component of agency (Crocker, 2008; Robeyns, 2003). Furthermore, because lists of capabilities are used for different purposes and in different contexts, the selection of capabilities necessarily will be influenced by the social, cultural, and geographical settings in which they are used. While Sen's rationale and emphasis on deliberative democratic processes as a way to select capabilities seems admirable, it is unclear how to implement these processes from a researcher's perspective.

As a result, a number of researchers have argued that determining a list of relevant capabilities, a priori, provides a practical facility. Martha Nussbaum, for example, has promoted a list of ten basic capabilities. This list of capabilities includes life; bodily health; bodily integrity; senses, imagination and thought; emotions; practical reason; affiliation; other species; play; and control over one's environment (Nussbaum, 2000, 2006). According to Nussbaum, this list, far from being a statement of universality or a paternalistic attempt at defining capabilities for all, is an open list that is amenable to discussion and modification. Rather than being a prescriptive list, this list of capabilities provides a starting point for governments or constitutions to ensure a basic level of well-being rather than the ultimate level of well-being (Nussbaum, 2000).

Even if one does not endorse a broad though universal list of capabilities as posited by Nussbaum, one still must come up with a list of capabilities due to the intrinsic

under-specification of Sen's framework. Robeyns (2003) has argued for a procedural approach to the selection of capabilities. According to Robeyns, it is better to avoid a blanket list of capabilities for either a practical or an academic exercise. She argues that there is value in adopting a *process* of selecting a list of capabilities, regardless of the purpose, as this gives the list more legitimacy.

Another aspect of CA which has been criticized or questioned is the tension between the individual and the society (Deneulin, 2008). As stated previously, CA focuses on the individual as the ultimate unit for evaluating development because other higher units of social organization for example, the family, could obscure intra-individual disparities. At the same time, because society is influential in giving rise to capabilities, sustaining them, and affecting individuals' value judgments about capabilities, these collective structures are also important units of analysis. Deneulin (2008) has argued that CA disables itself by placing individuals at the center stage of understanding capability, because it implies that capabilities may not be analyzed at higher levels of aggregation, such as society. According to her, extending the notion of capabilities as characteristics of societal levels guarantees that capabilities will be ensured as well at individual levels.

While Deneulin's (2008) arguments for extending the notion of capabilities from individuals to characteristics of societal units are valid, Robeyns (2008) has countered that Deneulin misrepresents CA in its ability to apply the concept to societal levels. Certainly, CA centers on the individual as being the ultimate unit of measurement, but it does not ignore the society in which these individuals exist. To understand which aspects of CA are individualistic, Robeyns (2008) asserts that it is important to distinguish between ethical or normative individualism and methodological and ontological

individualism. Ethical individualism postulates that when examining social institutions, factors, or characteristics we are only interested in the social institutions and their effects on the individual. But methodological and ontological individualism states that social institutions, factors, or characteristics can be understood by reducing them to the characteristics of individuals who comprise them. In this view then, social institutions, factors, or characteristics are nothing but additive aggregates of individual characteristics (Robeyns, 2008).

Robeyns (2000, 2005) has amply clarified that while Sen's CA is an ethically or normatively individualist approach, it is neither ontologically nor methodologically so. That is, CA is primarily interested in the effects of social factors on individuals but it does not preclude us from evaluating social units and societal characteristics and the capabilities they afford. Theoretically, CA accounts for social units and the constraints and opportunities that they offer individuals by (a) recognizing that individuals' conversions of commodities into functionings is strongly influenced by social structures and institutions and (b) theoretically distinguishing between functionings and capabilities, and postulating that, while capabilities are normatively more significant, they can be understood by examining social structures and constraints (Robeyns, 2008).

But the question is, how does a researcher empirically distinguish between functionings and capabilities? Sen (1999) prioritizes opportunity or freedom (i.e., capabilities) over outcomes (i.e., functionings). In Sen's distinction between capability and functioning, functioning is defined as the achievement of a valued state of "being or doing" (i.e., an outcome) (Sen, 1993, p. 43), while capability is variously defined as freedom, an ability to choose, an effective opportunity, or the capacity to achieve such

outcome. The capability set constitutes of the vectors of all possible functionings. And, it is this ability of an individual to choose from the capability set that is prioritized over an achievement or an outcome or functioning. Conceptually, this distinction makes sense and is not hard to understand.

However, empirically a researcher faces several challenges. Researchers have acknowledged that preferences or the ability to choose itself is socially constructed and is prone to adaptation to circumstances (Elster, 1982; Robeyns, 2005; Sen, 1984, 1992, 1993,1997; Teschl & Comim, 2005). For example, a girls' *choice* to continue going to school is formed or de-formed by what is possible for her to do in her social circumstances, which in turn, are defined by the context of cultural norms and the policy environment, among other things (Nussbaum, 2000).

Therefore, identifying what people would choose or value being or doing without being constrained by their circumstances, is a significant challenge for CA. Because capabilities are in a sense, *potential* functionings, questions that arise include (a) how do we measure a possibility and not an actuality?; (b) how do we measure what an individual could have achieved but did not?; and (c) how do we measure counterfactuals or unobservable variables? (Williams, 1996)

Sen (1992) has proposed examining realized states of the counterfactuals in question. Robeyns (2003) supports that and suggests that "Given that we have little direct information about people's capability levels, we could start by taking group inequality in achieved functionings as indicative of inequalities in capabilities" (p. 85). This blurring of categories of capabilities and functionings presents an empirical challenge because if researchers must rely on realized, achieved states or functionings, then the value of the

conceptual and philosophical distinction between capabilities and functionings is significantly attenuated (Comim, 2008; Walby, 2012).

Operationalizing CA for the Present Study

The previous section highlighted some of the methodological and technical challenges of CA that are not easily resolved. Nevertheless, since CA's inception in the mid-1980s, various statistical tools have been tested and applied to empirical applications of the capability approach (Martinetti, 2006). The present study also aims to address the challenges of CA raised in the last section. By conceiving capabilities at the societal level and the education functionings at the individual level, and by using Nussbaum's (2000) capability list as a launching pad, this study (a) empirically distinguishes between capabilities and functionings; (b) examines capabilities at societal levels; and finally, (c) uses a list of capabilities that is "sufficiently abstracted from empirical sources of variation that it is universal by construction" (Anand et al., 2009, p. 8). Or in other words, this study uses a list that has some empirically-based consensus about the specific capabilities to study education functionings.

Rationale for using Nussbaum's capabilities.

I use Nussbaum's (2000) conceptualization of capabilities in this study for several reasons. First, Nussbaum's attempt at generating a set of capability variables is one of the most concrete attempts.[7] Rather than being a lone attempt at defining capabilities, many others have attempted to identify these dimensions as well (Cummins,1996; Doyal & Gough, 1991; Ramsay, 1992). Alkire (2002a) reviewed several such lists produced by researchers, philosophers, and other social scientists. While she found that the dimensions

[7] Researchers (e.g. Alkire & Black, 1997) have argued that a "pre-determined" list of what capabilities matter "runs counter to an essential thrust of the capabilities approach which has been the attempt to redirect development theory away from a reductive focus on a minimally decent life towards a more holistic account of human well-being for all people" (p. 266).

are resource-dependent and that individuals and cultures pursue these dimensions in starkly different ways, there is significant overlap between the identified capabilities and relatively accepted dimensions of human development.

Another reason for choosing Nussbaum's list was the possibility to measure capabilities within extant datasets. Anand, Hunter, and Smith (2005) have argued that although the coverage is substantially incomplete, many capabilities, particularly those reflected in Nussbaum's list, can be measured in various development datasets.

Finally, Nussbaum's set of capabilities as stated earlier, are distilled to a higher, more general plane, and using these capabilities provides a convenient starting point. But more importantly, Nussbaum's capabilities are normative and can justifiably be part of a moral theory of justice.[8] That is, they capture opportunities to which all constitutions should minimally adhere.

Rationale for using capabilities at the societal level.

Keeping in mind the issues of empirically distinguishing between capabilities and functionings, and that capabilities are characteristics of both individuals and societal units, treating capabilities at higher levels of societal organization can help in measuring the notion of *effective opportunities* as distinct from achieved outcomes.

The underlying assumption of treating capabilities at group levels (e.g. family, neighborhood, districts, states or countries) is that individuals typically exist in groups and groups have characteristics that are specific to them. These group characteristics, capture the collective social characteristics or normative behaviors and attitudes of individuals and thus, tap into contextual capabilities or effective opportunities, which

[8] See Nussbaum (2011) for a moral justification of the capabilities and Kleist (2013) for a discourse ethics defense of the same.

may encourage or discourage success in education functionings. Hence, when variables are aggregated up to the district level they capture characteristics of districts rather than characteristics related to the individuals or households.

Rationale for using capabilities at the district level in India.

In India, districts as administrative units have long had influence on residents. Different districts, even in the same state, have different characteristics such as policy instantiations, administrative personnel, and priorities and therefore may have unique approaches to development. For example, the state of Maharashtra is divided into 36 districts spread across five geographically, historically, economically, and culturally diverse regions. Within these five different regions, each district has a distinct identity. Further, with the enactment of the 74th Constitutional amendments in 1992, districts within states have become the key administrative units administering all major development programs (Varghese, 1994). Consequently, districts now largely monitor their own primary education systems.

Other than the administrative significance of districts, people residing within a district are similar on many socio-cultural dimensions such as language, food, clothing, festivals, and practices. District-level capabilities make sense because, from a policymaking standpoint, it is desirable to see whether capabilities measured at this level are related to better education functionings.

Selecting Capabilities Relevant for Gender Inequality in Education

Following Nussbaum's list of capabilities, I study 6 of the possible 10 capabilities. These capabilities are rooted in social arrangements in a developing context, and have a potential impact on an individual child's ability to convert resources to the achievement of education functionings of reading, arithmetic, and writing. The list of

capabilities for this project mirrors capabilities outlined by Nussbaum (1995, 2000, 2003) as well as Robeyns (2003). Although, research on capabilities is still incipient, I provide research findings that inform the present study and the capabilities examined.

Life. Similar to Martha Nussbaum's and Ingrid Robeyns' conception of life, this capability refers to both being able to be born, and once born, being able to live an average life span. The capability of life has special significance for women in the particular context of India. India is a largely patriarchal culture where boys are valued as supports in old age and girls are viewed as financial burdens or poor investments due to practices such as dowry or the girls' leaving their natal home after marriage.

Unlike many places in the world, men also grossly outnumber women in India. Even though studies based on hospital birth records show that boys outnumber girls at birth, girls and women have lower death rates compared to males at most ages when women are given the same care and nutrition as males, likely because of women's greater resistance to infections and degenerative diseases (Kalben, 2002; Sen, 1990). Despite this, the ratio of women to men in India varies by region from .84 to .94 as compared to the typical 1.06 or higher in Europe and North America.

The adverse sex ratio for women (number of females per thousand males) in India has been attributed to a widespread culture of "son preference" and "daughter aversion"[9] (Borooah & Iyer, 2005, p.419). The culture of son preference or the desire for sons stems from the economic and socio-cultural *benefits* to the parents; and complementarily, the culture of daughter aversion stems from the *costs* to the parents of bearing daughters. The perceived costs of bearing daughters has been related to the mistreatment of young girls through female foeticide, infanticide, and female child neglect.

[9] Similar to other countries such as China.

The gender bias against women, both in the chances of being born and the chances of being able to survive, has been widely documented as the case of the "missing women" (Drèze & Sen, 1997; Drèze & Sen, 2002). This culture of son preference and daughter aversion reflects a culturally systemic discrimination against girls that is likely reflected in all aspects of a girl's and subsequently a woman's life.

Bodily health. I argue that this second capability also has the potential to influence girls' education and learning in schools. Broadly, research using general health indicators finds that women, even though they live longer, report greater morbidity or ill-health than men, with pregnant women reporting greater and longer illnesses than non-pregnant women (Murray et al., 1992). In the context of India, female health or morbidity is of particular concern. The son preference and the related daughter aversion in India, as mentioned earlier, results not only in increased female mortality in India, but also in female neglect and thus, morbidity. Statistics show that 79% of children between the ages 6 – 35 months and more than 50% of women are anemic (Qadeer & Ramachandran, 2007).

Poor health and morbidity of women and girls in India is culturally-rooted in patriarchal practices that affect their nutrition and health directly. For example, women and girls are typically the last to eat in a family. Thus, in households with food shortages females are more likely to suffer than males (Horowitz & Kishwar, 1984). Due to the norm of son preference, girls' and women's health issues are regarded secondary to boys' and men's health issues, who are regarded as the current or future bread-winners (Das Gupta, 1994; Desai, 1994). Especially in a poor household, where resources are scarce, if a girl has a disease or an illness, her medical care is often neglected. In addition, she is

more likely to be taken to a village healer rather than a doctor or a hospital and is more likely to not obtain complete treatment as compared to a boy (Bhalla, 1995; Jejeebhoy & Rao, 1995). In a context where bodily health may not be ensured, girls' performance in school is likely to be more negatively affected than boys' performance. In general, however, poor health is always under-reported and is confounded by poverty.

Bodily integrity. Similar to Nussbaum's (1995) capability, this capability refers to being able to be safe from bodily harm such as personal attacks or sexual violence. With respect to India, this capability also is gendered. With regard to personal attacks and sexual violence, studies suggest that women face a greater incidence of and more severity of violence than men (Tjaden & Thoennes, 2000). However, statistics on violent crime against women do not reflect the actual levels of these crimes because many incidents, particularly domestic violence, go unreported (Kelkar, 1992).

The violence that girls and women face is rooted in sex inequality and also serves to maintain unequal gender relations (Fulu et al., 2013; Sen & Ostlin, 2008). However, it is important that girls and children feel safe so that they can concentrate on their studies rather than their personal safety. Even when children are not the direct victims of violence they are likely to witness violence or know of someone who was involved in violence. Exposure to violence in these ways and others, or living in a violent context, can cause emotional and cognitive stress and lead to reductions in learning through either direct or indirect behaviors related to learning (Henrich, Schwab-Stone, Fanti, Jones, & Ruchkin, 2004; Schwartz & Gorman, 2003; Shakoor & Chalmers, 1991). For example, girls who witness violence may change their behaviors related to education - such as going to school or working on their homework - if spending time on those activities risks

an experience with violence or victimization for themselves or others around them. Similarly, research on neighborhood effects of violence in the U.S. have shown spillover disadvantages of violence on adolescent outcomes of high school graduation and teenage pregnancy (Harding, 2009).

Education. The education capability taps into the context of education and knowledge and the opportunities that are available for women in any particular household. Parental educational level is an important predictor of children's educational and behavioral outcomes (Davis-Kean, 2005; Jayachandran, 2002). Additionally, research suggests that parental education is a unique and significant predictor of children's education even in the western context (Duncan & Brooks-Gunn, 1997).

Studies in different countries, including Brazil, Chad, India, Pakistan, and Uganda, demonstrate that both maternal and paternal education affect children's educational outcomes, but on the whole, having an educated mother ensures that children go to school longer and study more (Behrman, Foster, Rosenzweig & Vashishtha, 1999; Deon, 2000). Multiple studies have also shown that a mother's level of education has a strong positive relationship with daughters' school enrollment, even controlling for other variables (Lavy, 1996; Ridker, 1997). In some studies, same-sex effects—the effect of adult female literacy on the educational outcomes for girls such as educational attainment or school attendance—were stronger than the cross-sex effects (Drèze & Kingdon, 2001; Ermisch & Pronzato, 2010; Jayachandran, 2002). Findings from these studies suggest that having literate or educated women in the household could lead to an advantage for girls. As Jayachandran (2002) argues, educated women are more likely to understand the benefits of education and, in turn, encourage education for their daughters. Additionally,

through their increased bargaining power achieved through education these women are better able to negotiate for their daughters' education.

Affliliation. Nussbaum (2011) defines the capability of affiliation as "…being able to live with and toward others, to recognize and show concern for other human beings, to engage in various forms of social interaction; to be able to imagine the situation of another and have compassion for that situation; to have the capability for both justice and friendship" (p. 33-34). Affiliation can be measured through social networks and the resulting social capital. Although social capital is measured in many different ways (Putnam, 2000), social networks created through social relations allow individuals advantages in a multitude of areas such as health, well-being, employment, and social influence (Granovetter, 1974; Haines, Beggs, & Hurlbert, 2008; Lin, Woelfel, & Light 1985). Social networks create temporary social resources, which, when accessed by direct or indirect ties within the network, can be used to produce a valued outcome (Lin, 1999). For example, access to a teacher in an individual's social network may help that individual navigate the educational system and its policies. In other words, the social resource—the direct tie to the teacher—can provide the individual access to the teacher's position, information, or power in school and can be used to achieve a certain goal related to education such as enrollment or access to a scholarship.

According to Moore (1990), employment, educational status, and income are positively and strongly related to network size and non-kin ties. Studies on social capital using social networks indicators, such as status of network member and number of non-kin members, have demonstrated positive correlations between social capital and educational outcomes of children (Bofota, 2013; Stanton-Salazar & Dornbusch, 1995).

Political empowerment. A facet of political empowerment is the confidence or faith in democratic institutions. Confidence in democratic institutions is an important determinant of civil participation because when citizens have higher levels of political confidence, they are more likely to feel efficacious; they believe their participation can make a difference (Hetherington, 1998; Levi & Stoker, 2000). While most studies of confidence in institutions have been confined to Western Europe or North America, studies examining aggregate data on generalized trust have found that generalized trust is highly correlated with effective democratic governance (Almond & Verba, 1963; Inglehart, 1990; Muller & Seligson, 1994).

However, Smith's (2008) study documents a more complex story of institutional confidence. Among other correlates of institutional confidence in America, he found a highly variable association between education and confidence in different democratic institutions. In his study, faith in major companies, scientific community, and the Supreme Court have a fairly strong positive association with education, but for eight institutions, including organized labor, television, military, education, Congress, organized religion, press and banks, the confidence decreases with education.

The capabilities described above are likely to be related to gender inequities, but the question arises as to how these gender equities in capabilities or real opportunities might reflect on how girls' compare to boys on education functionings.

Conclusion

In this chapter, I discussed four theories related to gender and equality in international education. I demonstrated through the enunciation of the four theories how the conception of and definition of women and gender equality has changed over the

decades. I argued, more specifically, that conceptions of the role of women in development has moved from a recognition of women as production agents in the process of development to a recognition of women as not just a *means* to development (Becker, 1962) but also as the *ends* of development *inter alia* (Sen, 1999). I also demonstrated how conceptions about achieving gender equality have moved away from focusing on women-only development projects to including the men, children, and families with whom they live and the institutions that shape their lives – political, social and economic. Finally, with regard to gender equality in education, I demonstrated how notions about the meaning of equality have progressed from merely securing the same amount of schooling for equal numbers of girls and boys to include women's real opportunities to be able to realize and achieve what they value, introducing much wider notions of gender equality in education that encompass "…substantive issues… of deep obligations between people…" (Unterhalter, 2008, p. 31).

After discussing the evolution of perspectives related to gender and equality, this chapter discussed in greater detail the theoretical and conceptual framework that underlies this study – the Capability Approach. While the other perspectives have significantly contributed to our understanding of gender-based inequalities and international education, the current study builds upon the work of Amartya Sen, Martha Nussbaum and Ingrid Robeyns and operationalizes the CA in terms of the specific capabilities that I believe play a role in shaping gender inequalities in primary education in India.

CHAPTER 3: METHODS

The purpose of this study is to explore the role of effective opportunities or capabilities in girls' education in India. Using the Capability Approach (CA), this study examines the role of capabilities and how these capabilities are related to education-related outcomes for children, especially girls. Outcomes that I examine include the following variables, which I conceptualize as education functionings using CA – reading, arithmetic, and writing proficiencies for children at the primary-age level.

To study the relationship between capabilities and education functionings for children, I utilize the Indian Human Development Survey (IHDS). The IHDS (Desai et al., 2005) was conducted by researchers from the University of Maryland in collaboration with the National Council of Applied Economic Research in India and includes a representative sample of 41,554 households across 684 districts of India. Researchers administered two one-hour interviews to eligible women in households on multiple dimensions of their family's economic and social well-being. One component of the study also included administering proficiency assessments in reading, arithmetic, and writing to children 8 to 11 years old.

I analyze a subset of these data using multilevel modeling to reflect the nested nature of the data (children residing within districts) and to differentiate between individual and contextual effects. The key relationships of interest in this study are between district-level capabilities, which I refer to as contextual capabilities, and children's reading, arithmetic, and writing proficiency. I also examine several individual-level variables – specifically religion and caste – that have been associated with capabilities, as well as other child characteristics (demographics and school experiences)

that may influence proficiency. A primary purpose of these analyses is to determine whether contextual-level capabilities have a differential influence on the reading, arithmetic, and writing proficiencies of girls. Do these contextual capabilities narrow or widen differences in attained proficiencies between boys and girls in India?

The chapter begins with a discussion of the design of the study, including a discussion of the study's three research questions and associated hypotheses. This is followed by a description of the data source (IHDS) and the analytic sample used for the study. It concludes with a description of the analytic method, variables used in the study, and preliminary analyses that justify the use of multilevel methods.

Design of the Study

In this study I examine the impact of capabilities at the individual and district levels on girls' versus boys' outcomes. The outcomes of interest are children's functionings as measured by reading, arithmetic, and writing proficiency tests. In accordance with the CA framework, the study rests on the premise that being educated is a widely valued functioning or a valued state of being. With the world becoming a knowledge-based economy, being educated also has become significantly important from an economic perspective, both for states and individuals (World Bank, 2009).

However, as Sen (1992) argues, people's capability to achieve valued functionings, such as education, varies as a result of differential access to social arrangements and economic resources. An examination of the distribution of capabilities (rather than just the distribution of functionings) can provide a better assessment of the equality of opportunities available to individuals or groups in various political and social settings. In other words, using a capabilities approach, I examine possible sources of

inequality in girls' educational outcomes associated with the characteristics of the districts in which girls live.

Conceptual Framework

The conceptual framework for the study is represented by Figure 3.1. In the top oval, which represents district characteristics, there are six contextual capabilities (Life, Bodily health, Bodily integrity, Affiliation, Political empowerment, Highest level of female education) that I conceptualize as having an influence on the educational opportunities afforded girls. While I tried to develop capability measures to target girls' opportunities, this was not always possible with the IHDS dataset. For example, the capabilities of life and bodily integrity reference opportunity structures that directly reference girls and women but then other capabilities such as bodily health and political empowerment reference opportunity structures that are linked to both girls and boys.

To measure these capabilities I aggregate the responses of survey respondents across households, with and without children, in each district. As such these measures represent potential contextual effects or district social and economic structures that could influence educational outcomes, including the educational achievement of girls I have also included at this level average household assets. Although average household assets is not conceptualized as a capability, the wealth of a district is an important contextual characteristic that is likely to influence educational outcomes for residents.

The box below the oval (child-related characteristics) includes gender and other conversion factors (e.g. demographics, household characteristics, and specific school experiences of children). The major demographic factor is gender, in that I am interested in determining the extent to which there is a gender gap in educational outcomes. Other demographic characteristics include age, caste, and religion. I also include a set of

variables that describe the household characteristics and the educational experiences of the children in the study. The educational outcomes – proficiency in reading, arithmetic, and writing – are in the box to the right in Figure 3.1. These are educational outcomes that I conceptualize as education functionings in the study.

Overall, the framework depicts a series of linear relationships between capabilities at the district levels that from a CA perspective can be said to influence education functionings, and in turn, influence the well-being of girls. Note that the framework conceptualizes the contextual capabilities as having a direct influence on the functionings of all children in a district and as having a possible differential influence on the functionings of girls. In other words, I have conceptualized the contextual capabilities as an interaction that could promote or detract from gender equality in the educational functioning of girls. . While there still may be considerable variation in girls' capabilities within any district, this conceptual model allows me to examine variations between districts in norms and opportunities that may influence girls' functionings. I represent this interaction with the arrow from the district level that bisects the arrow from the child level to the education functionings.

The model contains major constructs that variables tap in the study. They do not capture all possible capabilities or functionings that could be identified using a capabilities approach. Nonetheless, the framework provides an opportunity to examine educational opportunities and outcomes, particularly for girls, using a capabilities approach. Although not comprehensive, it highlights a series of structural and individual

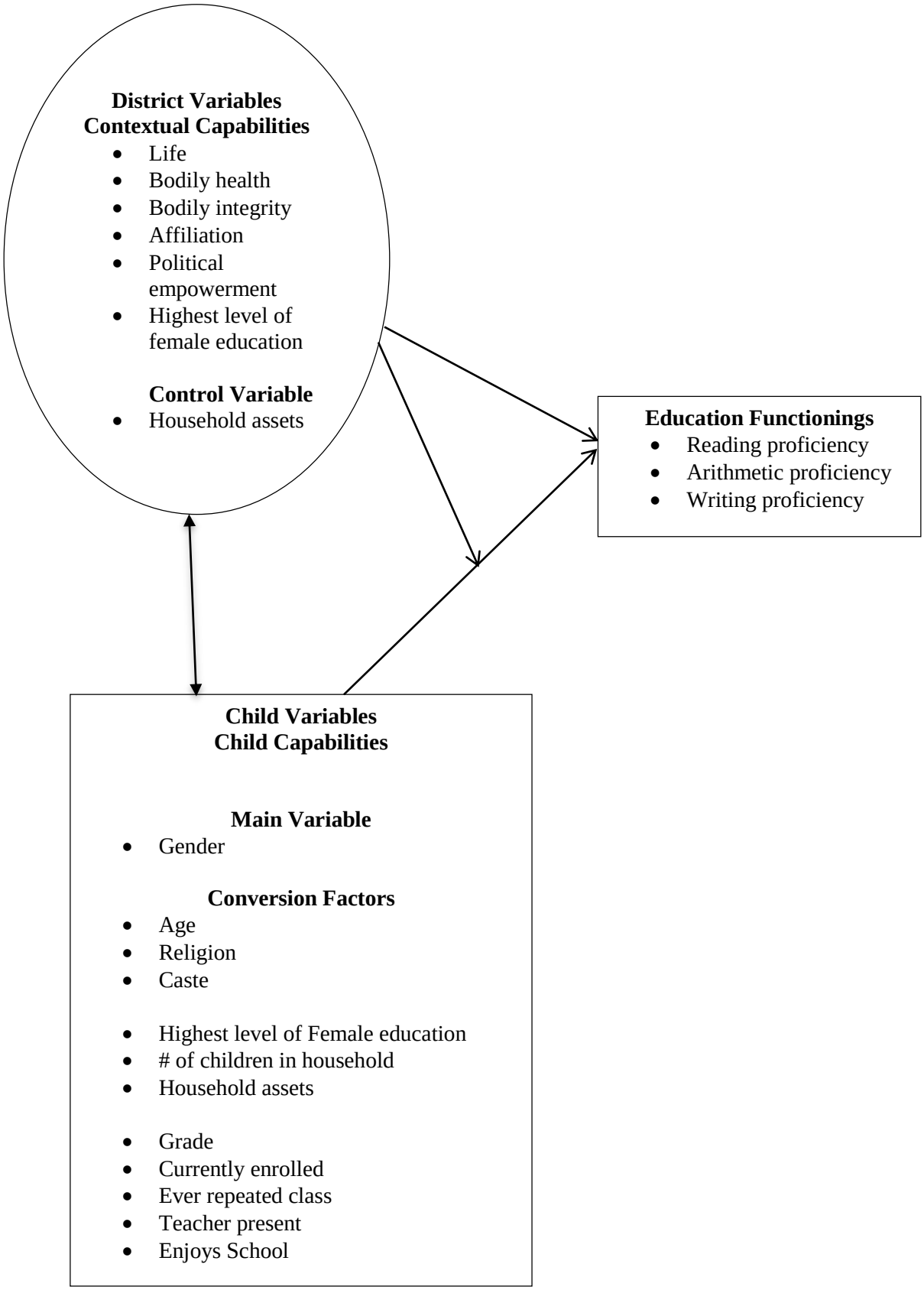

Figure 3.1 The effect of capabilities on achieved education functionings.

characteristics, as well as cross-level relationships, consistent with a capabilities approach and likely to influence the educational opportunities and achievement of girls in India.

Research Questions and Hypotheses

Using the conceptual framework just described, the study explores three main research questions:

1. To what extent are there individual gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels?
2. Does the relationship between gender and education functionings as measured by reading, arithmetic, and writing proficiency levels vary across districts?
3. Can gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels be explained by variation in the structure or contextual capabilities across districts?

The first research question estimates whether there is a difference in the proficiency levels in reading, arithmetic, and writing between boys and girls, after controlling for other individual characteristics such as age, grade, and specific school experiences. The second research question examines whether the gender difference in proficiency in reading, arithmetic, and writing varies across districts. That is, is there a constant gender difference or is the gender difference bigger in some districts versus others. The final research question estimates the effects of districts' capability structures or context on gender differences in proficiency levels. Although the primary focus of the study is to determine whether district level structures of capability influence the magnitude of gender differences in proficiency levels (question 3), I also examine

whether district-level structures of capability influence average proficiency levels for all children, regardless of gender.

Based on the extant literature highlighted in Chapter 2, I developed a series of hypotheses for each research question. These hypotheses specify the relationships and outcomes I expect to find within this study. Below, I summarize hypotheses articulating the relationship of a child's gender and her/his likelihood of achieving education functioning of reading, arithmetic, and writing, and the impact that capabilities can have on mitigating the gender gap on the outcome variables.

Hypothesis 1: Gender differences exist in education functionings.

As highlighted in Chapter 2 numerous studies have shown gender differences in a wide variety of education indicators. Specifically, girls (in India and other developing contexts) are often less likely to enroll, attend, learn, or transition to higher levels of schooling (e.g. Drèze & Kingdon, 2001; Kingdon, 2007; UNESCO, 2011b; UNESCO, 2012). I anticipate a similar phenomenon in my study with boys outperforming girls on the three outcome variables – the education functionings of reading, arithmetic, and writing proficiency.

Hypothesis 2: Gender differences in education functionings vary across district.

Although there is less literature that discusses variation in gender differences across different political divisions of countries than about gender differences in general, that which exists (e.g. Kingdon, 2007; UNESCO, 2011b) suggests that variation is likely to exist in urban and rural areas (e.g. Hnatkovska & Lahiri, 2013; Vaidyanathan, Nair, & Gopinathan, 2001). Research on education in India documents considerable inter-state variation in education by gender (e.g. Bandyopadhyay & Subrahmanian, 2008; Borooah & Iyer, 2002; Husain, 2011; Ward, 2007). Based on this research, I expect inter-district

variations (districts are part of states) such that, in some districts the gender gap on the three outcome variables of reading, arithmetic, and writing proficiency will be smaller than in other districts, and that the context of capabilities that characterize where a child lives influences her/his education functionings.

Hypothesis 3: Gender differences are influenced by the variation in capabilities across districts.

Finally, I hypothesized that the well-documented gender differences that favor boys over girls in education functionings can be explained in part by the context of capabilities. In other words, I anticipate that contextual capabilities shape the effective opportunities for girls to achieve (i.e. reading, arithmetic, and writing proficiency) and, where positive, can act to reduce the gender gap between girls and boys in educational achievement. While education research in India documents regional differences—that is, between states (e.g. Bandyopadhyay & Subrahmanian, 2008; Husain, 2011; Ward, 2007)—the present study contributes to education research with new knowledge about how contextual capabilities, measured as characteristics at the district-level, affect children's education functionings broadly, and particularly, gender differences in education functionings.

Source of Data

This research study utilized survey data from a nationally representative development dataset from India. The India Human Development Survey (IHDS) was conducted by researchers at the University of Maryland, College Park in collaboration with the National Council of Applied Economic Research (NCAER) in 2005 (Desai et al., 2005). The IHDS dataset is a multi-topic dataset of 41,554 households in 684 districts of India covering 1,503 rural villages and 971 urban neighborhoods. The IHDS

household sample was drawn using stratified random sampling and provides a representative sample of households across India. The IHDS sample contains 13,900 rural households that participated in a previous survey conducted by NCAER in 1993-94 and 28,428 new households that were added to the 2005 survey conducted by IHDS. Detailed documentation for the sampling technique and specifics about the survey can be obtained from the IHDS website (http://ihds.umd.edu/).

Data for the IHDS were collected through two one-hour interviews in each household. Data were obtained directly from the eligible women in the household and from up to two children in each household.[10] The interviews covered a range of development-related topics, including economic status, employment, health, and education. The interviews also included unique socially relevant topics such as marriage, fertility, social/political participation, and gender relations as well as beliefs and perceptions about children's education.

Assessment of children's educational outcomes were also conducted during these interviews. The IHDS assessments drew on the work of PRATHAM[11] and used modified assessments that were simple, relatively easy to administer and that were designed to measure proficiency in reading, arithmetic, and writing without raising test anxiety in the children (Desai et al., 2010). Both the interview protocol and the education assessments were translated into 13 Indian languages and administered by trained local interviewers.

[10]Questions related to health and education were administered to a woman in the household, most often the spouse of the household head. Questions related to gender relations were addressed to an ever-married woman between 15-49 in the household. The questions were skipped if no household member fit the above criteria. If there was more than one woman in the household who fit the criteria, one woman was randomly selected to answer the questions (Desai et al., 2010).

[11]PRATHAM is a non-governmental organization in India, focused on developing and measuring literacy.

Measures

Although the IHDS was not designed using a capabilities approach, the richness of the surveys provide opportunities to develop measures consistent with the approach and appropriate for examining differences in educational achievement between boys and girls within and among the districts of India. Several data recoding procedures for the variables in the IHDS dataset were conducted to prepare the outcome and predictor variables for analysis. I describe first the outcome variables followed by the independent variables, starting first with the child-level variables followed by the district-level variables.

Outcome variables.

This study considered three different outcome variables in order to represent students' education functionings – reading, arithmetic, and writing proficiencies. The IHDS incorporated direct measurement of reading, arithmetic, and writing skills of children in the sample through modified versions of tests administered by PRATHAM. In the reading section of the test, children were presented with 10-11 letters, 10 words, a paragraph of 3-4 sentences, and a short story. The arithmetic section of the test was comprised of number recognition, simple subtraction problems with borrowing, and division of a three-digit number with a one-digit number. Finally, in the writing section of the test, children were asked to write a simple sentence such as, "My mother's name is ___." The tests were selected for their easy administration and their ability to measure basic skills without engendering high levels of anxiety in children. Below is a description of each outcome measure.

A. READING. In the IHDS, the 5 reading levels (TA7LVL) were coded as 0= cannot read, 1= can read letters, 2 = can read words; 3= can read a

paragraph, and 4 =can read a story. To facilitate the interpretation of the coefficients derived from the ordinal regression, the READ variable created for this study was reverse coded 1 = can read a story; 2 = can read a paragraphs; 3 = can read words; 4 = can read letters; 5 = cannot read.

B. ARITHMETIC. In the IHDS, the 4 arithmetic levels (TA8LVL) were coded as 0 = Cannot read numbers, 1= can read numbers, 2 = can perform subtraction, 3 = can perform division. Again for the purposes of this study, I reverse coded the original variable TA8LVL to create the variable used in the ordinal regressions.

C. WRITING. In the IHDS, the 2 writing levels (TA9LVL) were coded as 0 = cannot write, 1 = Writes with 2 or fewer mistakes. Because I used logistic regression to examine the effects of capabilities on this form of functioning, I used the original variable and did not reverse code it.

Thus, the two outcome variables READING and ARITHMETIC are ordinal variables that rank order the children's performance with respect to reading and arithmetic proficiency, respectively. The proficiency levels represented by each variable are not necessarily equidistant or equivalent levels. This study therefore treats both READING and ARITHMETIC as ordinal variables. The WRITING outcome is a binary or dichotomous variable and is treated as such in the study.

Independent variables.

As described in Chapter 2, the present study focuses on two sets of capability predictors: (1) capabilities of children and (2) the context or structure of capabilities in the districts in which children reside. Capabilities at child-level include caste and religion. As described in Chapter 2, caste and religion in India, afford different

capabilities to children. I examine these capabilities at the individual level because, theoretically, there is no known geographical localization of people of particular castes or religions in India. Moreover, empirically, there was minimal variation in these variables at the district level – the proportion of the population identified as belonging to various castes and religious groups was roughly the same across districts.

Another set of predictors captures the context of capabilities in which the children live. I examine six capabilities: (1) life; (2) bodily health; (3) bodily integrity; (4) affiliation; (5) political empowerment; (6) highest level of female education. These predictors are aggregates of all households in the dataset, including households without children.

Child-level predictors. Child-level predictors are level-one variables that reflect characteristics of children in the sample. Child-level predictors include the primary variable of interest – GENDER – demographic conversion factors (AGE, RELIGION and CASTE), and additional two sets of conversion factor related to household characteristics and children's school experiences (HIGHEST LEVEL OF EDUCATION FOR WOMEN IN HOUSEHOLD, NUMBER OF CHILDREN IN HOUSEHOLD, HOUSEHOLD ASSESTS, and GRADE, CURRENTLY ENROLLED, EVER REPEATED, TEACHER PRESENT, ENJOYS SCHOOL).

A. GENDER: The primary variable of interest is coded as 1= girls and 0 = boys. I use boys as the referent group.
B. AGE: Children in the analytic sample ranged from 8-11 years, so I used age as a control variable to account for age-appropriateness of the reading levels. As age increases education functionings of individual children also tend to

improve. This variable was drawn from the original variable RO5 in the IHDS (2005) dataset.

C. RELIGION: Variable ID14 in the IHDS dataset records the religion of the household in one of seven commonly used categories: Hindu, Muslim, Christian, Sikh, Buddhist, Jain, Tribal and residual categories "Other" and "None." For this study, I recoded the above variable into a series of dichotomous indicators of whether the child was from a Hindu, Muslim or other religious background, where 1= yes and 0 = no. I expected that religion will also affect the dependent measures, such that, children particularly Muslim girls will have lower levels of proficiency on all three dependent variables. I combined Christian, Sikh, Buddhist, Jain and Tribal and residual categories into one category because of two reasons: (a) the number of children in each religious category was insufficient for comparison; and (b) research on girls' education has mainly focused on Muslim children's, particularly Muslim girls' inadequate participation in education. The group of Hindu children was excluded from the HLM models and was used as the reference group because compared to children from other religious backgrounds, particularly Muslim, Hindu children were the largest group and Hindu children tend to perform better on education indicators.

D. CASTE: Variable ID13 in the IHDS dataset records the caste of the household informant in one of four commonly used categories: Brahmin, Other Backward classes (OBC), Scheduled Castes (SC), and Scheduled Tribes (ST), and a residual "Other" category. The caste of Brahmins was excluded from

the HLM models and used as comparison group because traditionally the Brahmin caste has been associated with higher levels of education and children from the Brahmin caste usually perform well on various education indicators. Ultimately, the goal of policy should be to make education functioning at least as good as it is for children of Brahmin backgrounds.

E. HIGHEST LEVEL OF EDUCATION WOMAN IN HOUSEHOLD: The highest level of education attained by a woman in the household, who was 21 years or older, was coded into a series of dichotomous indicators of whether this woman had no education, only primary level education, beyond primary level education including graduate education, where 1= yes and 0 = no. The reference group was only primary level education.

F. NUMBER OF CHILDREN IN HOUSEHOLD: Drawn from the original variable NCHILD in the IHDS dataset, this variable is a series of dichotomous indicators whether the number of children in the household ranged from 1 to 2 (NCHIL12), 3 (NCHIL3), or 4 and above (NCHIL4A), where 1 = yes and 0 = no. The reference group was the modal category of 3 children in the household.

G. HOUSEHOLD ASSETS: The IHDS measures a household's economic status with three variables: consumption, income, and household assets. The three economic variables differ in their stability over time, such that, the household assets measure is the most stable, while the income measure is the least stable measure of a household's economic position (Desai et al., 2005). For this study, I used the household assets measure to assess a household's economic

position because it is the simplest measure of the three, and it is the best correlate of other household behaviors and outcomes (Desai et al., 2005).

H. GRADE: I also used grade as a control variable. Drawn from the original IDHS variable TA4, the variable grade captured the last completed grade of the student.

I. CURRENTLY ENROLLED: Drawn from the original variable (TA3), this variable is a dichotomous indicator where 0 = child not currently enrolled in school (also included children who were enrolled in the past) and 1 = child currently enrolled in school.

J. EVER REPEATED: This is a dichotomous variable where 0= child never repeated a grade and 1 = child repeated at least one grade.

K. TEACHER PRESENT: Drawn from the original variable (CH5) in the IHDS dataset, this variable is a dichotomous indicator variable where 0 = teacher not reported to be generally present in the school and 1 = teacher was reported to be generally present in the child's school.

L. CHILD ENJOYS SCHOOL: Drawn from the original variable (CH13), this variable is a dichotomous indicator where 0 = child is reported to not enjoy school and 1 = child is reported to enjoy school.

District-level predictors. In addition to the average economic status of households, district-level predictors included six contextual capabilities (LIFE, BODILY HEALTH, BODILY INTEGRITY, AFFILIATION, POLITICAL EMPOWERMENT, and EDUCATION) conceptualized to influence educational outcomes for children, particularly girls. These capabilities were created at the individual level and then

aggregated up to the household and then to the district levels to reflect the context of capabilities in which children in India reside. I expected that the direction of the relationship of all the contextual capabilities described below will be such that in districts that are higher on capabilities, that is, with a higher proportion of households with a particular capability characteristic, girls will have higher levels of proficiency and proficiency levels more equivalent to boys, as compared with districts which are lower on capabilities.

A. LIFE: Life capability is measured as the proportion of households in the district that had more girls than boys from the ages of 0-6.

B. BODILY HEALTH: This capability variable measured the proportion of households where children under the age of 11 years were unaffected by cough or cold.

C. BODILY INTEGRITY**:** This capability measure captured the proportion of households where the eligible woman did not believe that wife-beating was a "usual" practice for any one of these five situations: (a) if the wife went out without telling the husband; (b) if the wife's natal family did not give expected dowry; (c) if the wife neglected the household or the children; (d) if the wife didn't cook food properly; or (e) the husband suspected the wife of extra-marital relations.

D. AFFILIATION: This capability variable measured the average number of acquaintances or relatives of the household who are: (a) doctors or nurses in clinics; (b) teachers or school officials in the school system; or (c) persons in government service other than teachers or doctors.

E. POLITICAL EMPOWERMENT: This capability variable measured the average confidence of the household in 10 institutions of a democracy – (a) politicians to fulfill promises, (b) military to defend the country, (c) police to enforce the law, (d) State government to look after the people, (f) newspapers to print the truth, (g) Village Panchayats/Nagarpalika to implement public projects, (h) schools to provide good education, (i) hospitals and doctors to provide good treatment, (j) courts to mete out justice, and (k) banks to keep money safe.

F. EDUCATION: At the district level, this capability included two dichotomous indicators of the proportion of households with only a primary level or no education for the woman 21 years or older and the proportion of households with higher than primary level of education, including graduate education. The first dichotomous indicator was called education: none or primary education and was the reference category, while, the second dichotomous indicator was called education: greater than primary education.

G. HOUSEHOLD ASSETS: At the district level, this variable measured the average number of household assets such as cars, scooter, television, bicycle, phone and others assets.

Advantages and Limitations of the IHDS Dataset

The IHDS has a number of advantages and limitations relevant to the present study. First, data from the IHDS are based on a large-scale household survey conducted on a representative sample of 41,554 households. Although the present study uses a

subsample when analyzing proficiency levels (households with children ages 8 to 11), I use data from all households to develop the measures of capabilities at the district level. This enhanced both the validity of the measures of contextual capabilities, in that they are based on larger within district samples, and the representativeness of findings to households with children ages 8 to 11 in the Indian population.

Second, the IHDS is a human development survey that also includes data on household income, health, education, political and social participation, and gender relations. The richness of the data allow for the examination of a variety of issues in development, including issues consistent with a capability approach to examining girls' education in India. This is especially relevant for the present study, because it is not always feasible to develop capability measures from typical general purpose datasets.

Third, although the IHDS data were not collected using the Capabilities Framework, the dataset captures outcomes for children (measured by proficiency levels in reading, arithmetic, and writing) that can be examined as education functionings. Whereas a number of national level datasets in India capture enrollment and attendance information (e.g. National Sample Survey, 2007; 7th All India School Education Survey, 2002), none capture children's proficiency levels in education or include household level information on attributes such as income and health. These varied data points allow for the current study to explore how other household attributes can affect participation in education.

Finally, the IHDS dataset allows for the examination of issues at the state, district, household, and individual levels. Including data at multiple levels allows for better estimates of standard errors and permits researchers to examine how development

characteristics at the district-level influence households and opportunities available to residents within households and the districts. The nested structure of the dataset also permits for an examination of what I have called contextual capabilities or structural aspects of districts that could influence the educational opportunities afforded girls and boys in India.

These advantages make the study inferentially robust. However, the representativeness of these data comes at certain costs—that is, the cost of the specificity of variables, for instance (Strayhorn, 2008). The first disadvantage of the IHDS dataset for the current study is that it was intended to measure different, but related constructs. In a study using primary data, researchers have more control over the variables being measured. For example, the researcher can develop an item or several items to examine various facets of a construct and collect data on those items. However, in a secondary data analysis study, a researcher cannot control how a construct is measured. The researcher may thus be forced to create *proxies* for variables of interest and to compromise on the specificity of variables (Strayhorn, 2008).

A second disadvantage of the IHDS data is that the theoretical assumptions with which the data were collected may not be evident to researchers. That is, the researcher has no control over the assumptions underlying the construction of the survey or the theoretical underpinnings that inform the data collection process.

Other significant limitations of using large-scale data sets include problems of missing data in the form of missing values. Missing values on variables of interest in a dataset could jeopardize both the internal and external validity of a study and therefore,

any conclusions drawn from the findings and the ability to generalize to a broader population.

Despite the disadvantages discussed above there is significant value in using large-scale datasets in research in general and, particularly the IHDS for the present study. Strong theoretical underpinnings of a study can alleviate issues related to construction of proxies, while application of advances made in the addressing the issue of missing values can address some of these limitations of using secondary data (Croninger & Douglas, 2005). IHDS is a well designed and implemented development survey.[12] These attributes will help in developing conceptual and analytical strategies for addressing the challenges associated with secondary data analysis.

Analytic Method

The full IHDS includes data for 17,061 children between the ages 8-11 years in 684 districts in India. Due to missing data and the fact that not every 8-11 year old child was tested during data collection, my analytic sample used fewer children to explore the research questions. To explore the possible consequences of missing data at the child and district levels, I created two data files to correspond to the levels of analysis that I include in my models. The level-one data file contained the child-level outcomes, individual capabilities and related demographics characteristics, household characteristics, and school experiences. The level-two data file contained the district-level capabilities used in this study and a measure of average household assets for each district. Data in the two files were linked with a unique identifier variable. The subsections below describe the data filters that were applied to obtain the final analytic sample that consisted of 11,345 children nested within 500 districts of India, the treatment of missing data at each level,

[12]See Desai et al., 2010 for data validation.

and a comparison of the resulting analytic sample to the full sample to determine the parameters for generalization.

Missing Data about Children and Households

When data are missing from a sample, it can impact the results of a study's statistical tests and distort the parameters for generalizing to the original sample (Allison, 2002). In order to develop a plan for how to handle missing data, I assessed the extent of missing data for each of the study's level one variables. First, only those children who had complete data on all three education functionings – reading, arithmetic, and writing proficiency – were included in the study. Applying this data filter resulted in a loss of 4,863 cases, or over 28 percent of the study's 8-11 year old participants. Because the remaining sample size was robust and provided substantial statistical power, I proceeded to examine missing data for other variables.

A second filter was applied when I did a listwise deletion of all level-1 cases that were missing observations on the other variables: gender, age, grade, number of children in household, highest women's education, household assets, whether currently enrolled, ever repeated, teacher present in class, and whether child enjoys school. This resulted in a loss of 853 additional cases, or a loss of an additional 5 percent of the 8-11 year old participants. Thus, this study focused on a subsample of 11,345 of the original group of 17,061 8-11 year olds who were part of the IHDS.

Missing Data about Districts

Level-2 data in this study consisted of contextual capability variables aggregated from the entire set of Level-1 cases to the district level. Specifically, these measures include life, bodily health, bodily integrity, affiliation, political empowerment, and highest level of female education capabilities. I also aggregated household assets to

create a measure of district economic well being or wealth. These variables were then standardized and expressed as z-scores with a mean of 0 and an S.D. of 1. Because I was able to draw from all of the cases in a district (households with and without children), missing data did not pose a problem at the district level. The smallest number of valid cases within a district was 11, with an average of 426 cases across districts, which provided a sufficient sample from which to estimate district characteristics.

Examination of Possible Sample Bias

To examine the possibility of sampling bias due to missing data, I conducted a comparison of the analytic and full samples to examine if the former sample closely resembled the latter (see Croninger & Douglas, 2005 for a discussion of this technique). I used a subset of the variables that I included in my analysis – specifically, mean household assets, percent Muslim children, percent of female respondents who said children in the household enjoy school, percent who said teacher is usually present, and percent of respondents residing in an urban area. I report these comparisons in Table 3.1. Column 2 provides sample sizes, means and percentages for the analytic sample (the proposed sample for the study) while column three provides sample sizes, means and percentages for the full sample (cases that would have been included if none was dropped due to missing data). While roughly one third of the households with 8-11 year old children were dropped from the analytic sample due to missing data, there are only minor differences between the analytic and full sample on these variables. The difference in household assets is .24 or 4% of a SD while differences on all of the other measures are typically less than one percentage point. The largest difference is for the percent Muslim; the percent of the analytic sample that is Muslim is 1.3 percentage points less than the

percent of the full sample that is Muslim. Thus, when compared to the full sample, the models based on the analytic sample are not likely to yield biased estimates.

Table 3.1 Selected Characteristics of 8-11 year-olds in Analytic Sample (n = 11,345) and Full Sample (n = 17,061)

	Analytic Sample (n = 11,345)			Full Sample (n = 17,061)		
Characteristic			%			%
Children who enjoy school			93.04			92.91
Muslim			13.52			14.84
Teacher present in school			96.91			96.82
Urban			30.21			29.43
	n	*M*	*SD*	*n*	*M*	*SD*
Household Assets	11,345	11.62	5.94	17,061	11.38	5.97

Note. Means, standard deviations and n are unweighted.

Description of Analytic Sample – Child-Level Predictors

In Table 3.2, I describe the analytic sample using the child-level predictors included in the study. The table displays means and percentages for boys in column one, girls in column two and all children in column three. Where appropriate, I report standard deviations in parentheses. As the table demonstrates, differences between boys and girls in the analytic sample are minor. The mean age is approximately nine and a half years old. Children come from households with comparable assets and comparable family size. The highest level of education attained by a woman in the household was equivalent roughly to the proportion of boys and girls in the sample, as were the percentages for different regions and caste. There was also no appreciable difference in school experience, with the average student in grade three and no indication of differences in

enrollment, enjoying school, having a teacher present most of the time, or ever repeating a grade.

Description of Analytic Sample – Dependent Variables

Whereas boys and girls in the analytic sample were generally similar on the Level-1 predictors, as shown in the previous table, I explored if there were any differences between them in terms of the dependent variables. I conducted bivariate analyses between each of the three outcome variables and gender to determine if there were differences between boys and girls in proficiency levels. Tables 3.3, 3.4, and 3.5 contain the results of these analyses.

In Table 3.3 we find that while only a few children are unable to read, when these data are disaggregated by gender, a slightly greater percentage of girls than boys cannot read (9.47% versus 7.41%). Relatedly, a smaller percentage of girls are represented at the higher levels of reading proficiency than boys (35.03% versus 37.56%). I conducted Kruskal-Wallis equality of populations rank test, a non-parametric method to evaluate if these differences were noteworthy. The Kruskal-Wallis test is used when there is an independent variable with two or more levels (for e.g. gender – boys and girls) and an ordinal dependent variable (reading proficiency with the five levels mentioned). The results of this test indicate that there is a significant difference among boys and girls in their levels of reading proficiency.

Table 3.2 Descriptive Statistics of Predictors from Final Analytic Child-Level Sample

Child-level predictors	Boys 53% (*n*=6,004) *M (SD)*		Girls 47% (*n*=5,341) *M (SD)*		Total 100% (*n*=11,345) *M (SD)*	
Demographics						
Age	9.47	(1.06)	9.48	(1.05)	9.47	(1.06)
Household characteristics						
Household assets	11.62	(5.95)	11.63	(5.91)	11.62	(5.94)
Number of children in the household	3.07	(1.49)	3.34	(1.55)	3.20	(1.53)
Highest level of education attained by a woman 21 years or older in the household						
No schooling	50.78		49.00		49.94	
0-5 years (Primary)	15.41		16.16		15.76	
5-Graduate (Post-primary)	33.81		34.84		34.30	
Religion						
Hindu	79.11		79.27		79.19	
Muslim	13.39		13.67		13.52	
Other Religions	7.50		7.06		7.29	
Caste						
Brahmin	5.28		5.86		5.55	
Other backward classes (OBC)	40.39		39.67		40.05	
Scheduled castes (SC)	21.64		22.37		21.98	
Scheduled tribes (ST)	7.11		7.26		7.18	
Other	25.58		24.83		25.23	
School experience						
Enrolment status (YES)	89.06		88.84		88.96	
Grade	3.14	(1.48)	3.20	(1.49)	3.17	(1.49)
Enjoy (YES)	92.37		93.78		93.04	
Teacher present (YES)	96.92		96.91		96.91	
Ever repeated a class (YES)	11.06		10.60		10.84	

Table 3.3 Child-level Reading Proficiency Descriptive Statistics for the Analytic Sample, (n = 11,345)

			Females	Males
Reading proficiency level[a]	*n*	Child level proportion[b]	%	%
Can read story (1)	4,126	36.37	35.03	37.56
Can read paragraph (2)	2,512	22.14	22.07	22.20
Can read words (3)	2,290	20.19	19.79	20.54
Can read letter (4)	1,466	12.92	13.63	12.29
Cannot read (5)	951	8.38	9.47	7.41

[a]Kruskal Wallis Equality of Populations Rank Test significant at .001 level. [b]$P(R \leq \text{cat.}\, j)$, where R = proficiency level, and j = 1,2,…5 possible values for reading proficiency.

Similarly, for Table 3.4 we find that only 16.11 percent of children are unable to read numbers or are in the lowest arithmetic proficiency level. However, when disaggregated, the data again reveal an over-representation of girls in the lowest level of arithmetic proficiency compared to boys (18.76% versus 13.76%). There is also a smaller percentage of girls (21.89%) in the highest level of arithmetic proficiency compared to boys (26.02%). The Kruskal-Wallis equality of populations rank test for these data also reveal a statistically significant difference between boys and girls and their arithmetic proficiency across the four levels.

Table 3.4 Child-level Arithmetic Proficiency Descriptive Statistics for the Analytic Sample (n = 11,345)

			Females	Males
Arithmetic proficiency level[a]	*n*	Child level proportion[b]	%	%
Can perform division (1)	2,731	24.07	21.89	26.02
Can perform subtraction (2)	3,161	27.86	27.09	28.55
Can read numbers (3)	3,625	31.95	32.26	31.68
Cannot read numbers (4)	1,828	16.11	18.76	13.76

[a]= Kruskal Wallis Equality of Populations Rank Test significant at .001 level. [b]$P(R \leq \text{cat.}\, j)$, where R = proficiency level, and j = 1,2,…4 possible values for arithmetic proficiency.

Table 3.5 indicates that almost 70.00 percent of the children in this sample are able to write with two or fewer mistakes. The writing test was a relatively simple test that required children to write their name or simple sentences with two or fewer mistakes, possibly creating a ceiling effect for children this age. Regardless, once disaggregated, the data once again reveal modest gender differences in writing, with 68.43 percent of girls able to write with 2 or fewer mistakes compared to nearly 71.40 percent of boys. Again, the Kruskal-Wallis Equality of Proportions Rank test for writing proficiency indicates a significant statistical difference between girls and boys and their levels of writing proficiency. Although differences in proficiency are relatively small, there are statistical significant differences between boys and girls for all three types of proficiency – reading, arithmetic, and writing. In each case, boys displayed higher levels of proficiency than girls, providing initial justification for this study.

Table 3.5 Child-level Writing Proficiency Descriptive Statistics for the Analytic Sample, (n = 11,345)

Writing proficiency level[a]	*n*	Child level proportion[b]	Females %	Males %
Writes with two or fewer mistakes (1)	7,942	70.00	68.43	71.40
Cannot write (0)	3,403	30.00	31.57	28.60

[a]= Kruskal Wallis Equality of Populations Rank Test significant at .001 level. [b]$P(R \leq \text{cat. } j)$, where R = proficiency level, and j = 1 or 0 possible values for writing proficiency.

Multilevel Models

This research study was conducted using multilevel models also known as hierarchical linear modeling (HLM) to examine variation between district-level capabilities in the three education functionings of reading, arithmetic and writing proficiency. I utilized HLM for three specific reasons. First, HLM allowed me to test my hypothesis that children's education functionings are influenced by individual characteristics at the child level and contextual capabilities at the district level. Second, HLM took into account the nested nature of the data (children nested within districts). In doing so, HLM permits the proper estimation of standard errors for nested data structures by parsing out the variance components, both within and between districts. Finally, HLM also facilitated an examination of the extent to which the capabilities moderate the relationship between a child's gender and the child's proficiency in reading, arithmetic or writing, the primary focus of this study.

The two-level hierarchical linear modeling (children nested within districts) in this study was conducted using the software program HLM (version 7.01) for Windows 2013 (Raudenbush, S. W., Bryk, A. S., & Congdon, R., 2013). In this study, two of the

dependent variables (reading and arithmetic proficiency) were ordinal variables having 5 and 4 proficiency levels, respectively, while writing proficiency was a dichotomous variable. The next few paragraphs outline the treatment and analytic models used for the ordinal variables followed by a description of the treatment and analytic model used for the dichotomous variable.

Ordinal variables: Reading and arithmetic proficiency.

As mentioned above, this study uses two ordinal variables – reading proficiency and arithmetic proficiency. The reading proficiency outcome variable was coded 1 = can read a story, 2 = can read paragraphs, 3 = can read words, 4 = can read letters, 5 = cannot read. Similarly, the arithmetic outcome variable was coded 1 = can do division, 2 = can do subtraction, 3 = can read numbers, 4 = cannot do arithmetic. The reading and arithmetic proficiency variables were treated as ordinal, in which a latent continuous variable (reading and arithmetic proficiency, respectively) is associated with the proficiency data. Thus, children with low proficiency in reading and arithmetic have a higher likelihood of being in level 5 or level 4, respectively, whereas, children with high levels of proficiency in reading and arithmetic have a higher likelihood of being in categories 1 or 2 (Raudenbusch, Bryk, Cheong, & Congdon, 2004).

Coefficients in ordinal HLM express the change in the cumulative log-odds, also known as logits, of being in the lowest category as a result of a unit change in the predictor after adjusting for all other predictors (Gracia & Herrero, 2008). Given that the lowest category, for the reading proficiency outcome variable in this study is high proficiency or 1= can read a story, a negative coefficient means that higher values of the predictor are associated with a reduction in the log-odds of being in the initial categories for proficiency (high reading proficiency or can read a story). As a general rule, in the

models that I estimate, negative coefficients mean lower reading proficiency (greater likelihoods of being in categories 4 or 5) and positive coefficients mean higher reading proficiency (greater likelihood of being in categories 1 or 2). The same is true for arithmetic proficiency – negative coefficients indicate lower levels of proficiency while positive coefficients indicate higher levels of proficiency.

For an ordinal outcome (reading or arithmetic proficiency), the ordinal model is characterized as follows:

Level 1: $\eta_{kij} = \ln(Y'_{kij}) = \ln\left(\frac{P\,(R_{ij}\ \leq k}{P\,(R_{ij} > k}\right) = \beta_{0j} + \sum_{q=1}^{Q} \beta_{qj} X_{qij} + k = 2K - 1D_{kij}\delta k$

Level 2: $\beta_{qj} = \gamma_{q0} + \sum_{s=1}^{S_q} \gamma_{qs} W_{sj} + u_{qj}$

(Raudenbusch & Bryk, 2002).

The model fits the proportional odds (PO) or cumulative odds model using the cumulative logit link for reading and arithmetic proficiency. For an ordinal outcome variable with five levels, as in the reading proficiency variable in this study, there are 5 possible proficiency outcomes – 1,2, 3, 4, and 5 (O'Connell et al. 2008). Cumulatively, the data can be partitioned into four "splits" as follows Y≤ 1, Y≤ 2, Y≤ 3, Y≤ 4, Y≤ 5 (where Y represents each of the sequential response category possibilities). Because all observations are contained in what could be called the final split, Y≤ 5, this last cumulative representation is redundant. Across these cumulative splits, if we imagine a series of binary logistic regressions, such that each split is being used to estimate the probability of a child's proficiency level being at or below that specific response category, then according to the PO assumption, the effect of any explanatory variable remains constant regardless of the response value identifying each split. So the effect of gender, for example, is assumed to be the same whether we are referring to the

probability of a response being less than or equal to category 1 or to a response being less than or equal to category 3.

Dichotomous variable: Writing proficiency.

The dichotomous variable – writing proficiency – was coded 1 = cannot write, 0 = writes with 2 or fewer mistakes. For dichotomous outcomes, such as writing proficiency in this study, coded as 0 (cannot write) or 1 (writes with 2 or fewer mistakes), 1 represents the "success" outcome or the event of interest – that is, the probability of being able to write with 2 or fewer mistakes. The hierarchical logistic regression model predicts the probability of success dependent on a collection of continuous or categorical predictors through application of the logit-link function. The logistic model is characterized as follows:

Level 1: $\eta_{ij} = \beta_{0j} + \beta_{1j} X_{1_{ij}} + \beta_{2j} X_{2_{ij}} + \ldots \beta_{qj} X_{q_{ij}}$

Level 2: $\beta_{qj} = \gamma_{q0} + \sum_{s=1}^{S_q} \gamma_{qs} W_{sj} + u_{qj}$

For the hierarchical logistic regression models, I report the population average results, which are robust to erroneous assumptions about the specification of the random effects in the model (Heagerty & Zeger, 2000), and are more useful than the unit-specific results when the inferences are focused on group-level or contextual variables (O'Connell, Goldstein, Roger & Peng, 2008), as is the case in this study. Finally, the term "likelihood" used in the reporting of refers to greater log odds, greater odds ratios or greater probability of an event occurring (Lee & Burkham, 2003).

Conclusion

This chapter addressed the methodological approach and specific methods that are used in the current study. It presents the conceptual framework for the study, the research

questions and hypotheses. In this chapter, I also describe the source of data, the measures used in the study, and the analytic sample. To answer the research questions, Hierarchical Generalized Linear Modeling was employed. These analyses shed some light on the impact of capabilities on proficiency in reading, arithmetic and writing at the primary school level in India.

CHAPTER 4: RESULTS

In this chapter I present the results of the statistical analyses conducted to examine the relationship between what I have referred to as contextual capabilities and individual education functionings, particularly with respect to girls in India. I present results from a series of multilevel or hierarchical linear models (HLM) created to address the study's three research questions:

1. To what extent are there individual gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels?
2. Does the relationship between gender and education functionings as measured by reading, arithmetic, and writing proficiency levels vary across districts?
3. Can gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels be explained by variation in the contextual capabilities across districts?

Although the primary focus of the study is to determine whether district-level capabilities influence gender differences in individual proficiency levels, I also examine whether district-level capabilities influence average proficiency levels for all children, regardless of gender.

In the first series of statistical models, I explore the empty or the null model. This model partitions the variance in the dependent variables within and among districts and provides an estimate for how much of the variance in the dependent variables might be explained by the characteristics of the districts in which children reside. My second set of analyses explore the within model – that is, the relationships between the individual characteristics of children and their proficiency levels, including whether girls and boys

have different levels of proficiency and whether the difference varies as a function of the districts in which the children live. In my final, fully conditional model, I incorporate district characteristics into the model – the six contextual capabilities and a control for average household assets. This model estimates the influence of contextual capabilities on average functionings and the gender gap in functionings.

Continuous independent variables in the models, including the contextual capabilities, were z-scored (M = 0; SD = 1). As a result, coefficients can be interpreted as the change in the log odds or odds ratio for every standard deviation change in the independent variables. Categorical variables were dummy coded. The referent group for each set of dummy coded variables is identified with a footnote at the bottom of each table. All level-1 and level-2 continuous variables are grand-mean centered, such that the estimates of the level-2 coefficients are irrespective of differences between districts in average household and individual characteristics (Ma, Ma, & Bradley, 2008). The one exception is gender, which is group-mean centered in models that include its random effect.

I used the HLM2 module of the statistical package HLM 7.01 to estimate the multilevel ordinal and logistic models. The HLM2 module assumes a two-level model and permits the specification of generalized multilevel linear models; these models are necessary for limited dependent variables, such as those used in this study. HLM 7.01 uses restricted penalized quasi-likelihood (PQL) procedure to estimate the parameters. PQL is the most common estimation procedure for generalized linear multilevel models (Raudenbusch, Bryk, & Cheong, 2004).

The chapter outlines the results obtained for the three proficiency variables and contextual capabilities described in the previous chapter. The results are presented according to the models (mentioned above) that address each of the study's research questions. Because of the variability between rural and urban settings in India, I present the models for rural districts and urban districts separately. I summarize my hypotheses for each research question; discuss the model's results, comparing urban and rural estimates; and discuss, when appropriate, how those results answer the study's research questions. The chapter concludes with a brief summary of findings, which I elaborate on in the last chapter, Chapter 5.

Fully Unconditional Models

The first step in a multilevel modeling typically involves partitioning the variance in the outcome into its within- and between-level components (Lee & Burkam, 2003). While fully unconditional models are primarily used to estimate the variance structures for continuous, normally distributed dependent variables, a number of researchers have suggested ways to estimate these structures for limited dependent variables (O'Connell, Goldstein, Rogers, & Peng, 2008). I use these models to estimate the intra-class correlation for each dependent variable – that is, the proportion of total variance in a dependent variable among level-2 units or districts. The ICC indicates the extent to which children's individual values for the three outcome variables (reading, arithmetic, and writing proficiencies) depend on the districts in which they live.

The empty model for the two ordinal outcomes (reading and arithmetic) is represented as follows:

Level 1: $\eta_{k_{ij}} = \ln\left(Y'_{k_{ij}}\right) = \ln(\frac{P\,(R_{ij} \leq k}{P\,(R_{ij} > k}) = \beta_{0_j} + \sum_{k=2}^{K-1} D_{k_{ij}}\delta_k$

Level 2: $\beta_{0_j} = \gamma_{00} + u_{0_j}$

For the fully unconditional model, γ_{00} represents the log odds for the intercept for the first cumulative split (i.e., the average log odds for scoring at the highest level of proficiency) across all districts and u_{0_j} is the estimate the variability among districts in the intercept (O'Connell et al., 2008).

The empty model for the dichotomous outcome (writing) is represented as:

Level 1: $\eta_{ij} = \beta_{0_j}$

Level 2: $\beta_{0_j} = \gamma_{00} + u_{0_j}$

In this model, γ_{00} represents the log odds for the intercept (i.e., average log odds of being proficient in writing) across all districts and u_{0_j} is the estimate the variability among districts in the intercept (O'Connell et al., 2008)

Fully unconditional model – reading proficiency.

The results of the fully unconditional models for reading proficiency are presented next. Table 4.1 presents the results for rural districts and Table 4.2 presents the results for urban districts. In these models, the event of interest being modeled is that of having a response at proficiency level 1 for reading, which, given the coding of the variable, represents the highest level of proficiency in reading. The estimates for the intercept (γ_{00}) and each subsequent threshold (δ_k) are presented in the top panel, along with a test for whether the coefficient is significantly different from zero (p. < .05). The bottom panel provides an estimate of the ICC and a Chi-square test for whether the estimate of the variance between districts in the log odds of the intercept is significantly different from zero (p < .05).

Rural districts. The results in Table 4.1 indicate that the estimated log odds across rural districts of being at the highest level of proficiency for a child in this sample is -0.78, corresponding to an estimated odds, exp (-0.78), of .46, and estimated probability, $P\ (R_{ij} \leq 1)$, of .31. In other words, in the average rural district, slightly less than one third (31%) of children scored at the highest level of proficiency in reading.

Table 4.1 Results for Fully Unconditional Model for Reading Proficiency in Rural Districts

Fixed Effects	*Coefficient (SE)*		*Odds Ratio (OR)*	*t (df)*		*p*
Model for reading proficiency (β_0)						
Intercept (γ_{00})	-.78**	(.05)	.46	-15.01	(282)	<.001
For thresholds:						
δ_2	.97**	(.02)	2.64	44.75	(7632)	<.001
δ_3	2.05**	(.03)	7.77	67.51	(7632)	<.001
δ_4	3.18**	(.04)	24.05	75.02	(7632)	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.52**	282	1471.03
Intraclass correlation coefficient	.14		
Reliability	.74		

* $p < .05$. ** $p < .01$.

The intra-class correlation (ICC) is the proportion of total variance in proficiency levels that might be attributable to the characteristics of the districts. The ICC for ordinal data can be defined in the following way (O'Connell et al., 2010; Snijders & Bosker, 1999):

$$\text{ICC} = \frac{\tau_{00}}{\tau_{00} + 3.29} = \frac{.52}{.52+3.29} = 0.14,$$

Where τ_{00} represents the variance among districts and 3.29 corresponds to $(\pi^2/3)$, the variance of the logistic distribution within districts. An ICC of 0.14 indicates that approximately 14% of the variance in proficiency could be explained by the characteristics of rural districts, and the Chi-square test indicates that the variance estimate is significantly different from zero, τ_{00} = .52, p < .01.

Urban districts. Table 4.2 displays the results for the fully unconditional model for reading proficiency for children in urban districts. The log odds of being at the highest level of proficiency for a child in an urban district in this sample is -0.23, corresponding to an estimated odds, exp(-.23), of .79 and estimated probability, $P\ (R_{ij} \leq 1)$, of .44. That is, in the average urban district, more than two fifths of children (44%) scored at the highest proficiency level in reading. The ICC for the fully unconditional model in urban districts, using the formula explained previously, is .12, and the Chi-square statistic indicates that variability around the intercepts for this collection of urban districts is significantly different from zero, τ_{00} = .45, p < .001.

Table 4.2 Results for Fully Unconditional Model for Reading Proficiency in Urban Districts

Fixed Effects	*Coefficient (SE)*	*Odds Ratio (OR)*	*t (df)*	*P*
Model for reading proficiency (β_0)				
Intercept (γ_{00})	-.23 (.06)	.79	-3.71 (216)	<.001
For thresholds:				
δ_2	1.11 (.03)	3.03	32.33 (3207)	<.001
δ_3	2.13 (.05)	8.41	41.85 (3207)	<.001
δ_4	3.40 (.08)	29.96	40.19 (3207)	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.45 **	216	615.02
Intraclass correlation coefficient	.12		
Reliability	.60		

* $p < .05$. ** $p < .01$.

Fully unconditional model – arithmetic proficiency.

The results of the fully unconditional models for arithmetic proficiency are presented next. Table 4.3 presents the results for rural districts and Table 4.4 presents the results for urban districts. The tables for these models provide the same information as the tables for reading proficiency, with the exception that the models include one fewer threshold (δ_k).

Rural districts. Table 4.3 provides the results for the fully unconditional model for arithmetic proficiency for children in rural districts. The table indicates that the log odds of being in the highest proficiency level in arithmetic for a child in a rural district in this sample is -1.51, corresponding to an estimated odds, exp. (-1.51), of .22 and

estimated probability, $P\ (R_{ij} \leq 1)$, of .18. In other words, in an average rural district, 18% of children scored in the highest level of proficiency in arithmetic. The ICC for arithmetic proficiency in rural districts is .15, indicating that approximately 15% of the variance in arithmetic proficiency might be explained by district characteristics. The variance between districts is statistically significant, τ_{00} = .59 , p < .001.

Table 4.3 Results for Fully Unconditional Model for Arithmetic Proficiency in Rural Districts

Fixed Effects	*Coefficient (SE)*	*Odds Ratio (OR)*	*t (df)*	*p*
Model for arithmetic proficiency (β_0)				
Intercept (γ_{00})	-1.51 (.06)	.22	-26.70 (282)	< .001
For thresholds:				
δ_2	1.30 (.02)	3.67	49.12 (7633)	<.001
δ_3	3.10 (.03)	21.98	80.60 (7633)	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.59**	282	1584.23
Intraclass correlation coefficient	.15		
Reliability	.76		

* $p < .05$. ** $p < .01$.

Urban districts. Table 4.4 provides the results for the fully unconditional model for the arithmetic proficiency of children in urban districts. The table indicates that the log odds of being in the highest level of proficiency for a child in an average urban district is -.84, corresponding to an estimated odds, exp. (-.84), of .43 and an estimated probability, $P\left(R_{ij} \leq 1\right)$, of .30. Stated somewhat differently, 30% of children in an

average urban district scored at the highest level of proficiency in arithmetic. The ICC for arithmetic proficiency in urban districts is .15, and the variance between districts in the estimate of the intercept is significantly different from zero, τ_{00} = .58, p < .001.

Table 4.4 Results for Fully Unconditional Model for Arithmetic Proficiency in Urban Districts

Fixed Effects	*Coefficient (SE)*	*Odds Ratio (OR)*	*t (df)*	*p*
Model for arithmetic proficiency (β_0)				
Intercept (γ_{00})	-.84 (.07)	.43	216	< .001
For thresholds:				
δ_2	1.53 (.04)	4.62	3208	<.001
δ_3	3.26 (.07)	26.05	3208	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.58**	216	764.20
Intraclass correlation coefficient	.15		
Reliability	.66		

* $p < .05$. ** $p < .01$.

Fully unconditional model – writing proficiency.

The results of the fully unconditional models for writing proficiency are presented next. Table 4.5 presents the results for rural districts and Table 4.6 presents the results for urban districts. The tables for these models provide the same information as the tables for reading and arithmetic proficiency, with the exception that models include only the intercept (γ_{00}) because the dependent variable is binary.

Rural districts. Table 4.5 presents the results of the fully unconditional model for writing proficiency for children in rural districts. The table indicates that the log odds of

being proficient in writing for a child in an average rural district is .74, corresponding to an estimated odds, exp. (.74), of 2.10 and an estimated probability, $P\left(R_{ij}=1\right)$, of .68. In other words, approximately two thirds of the children (68%) in an average rural district could write their name and a simple sentence with fewer than two mistakes. The ICC for writing proficiency is .16, and the estimate of the variance is significantly different from zero, τ_{00} = .62, p < .001.

Table 4.5 Results for Fully Unconditional Model for Writing Proficiency in Rural Districts

Fixed Effects	*Coefficient (SE)*	*Odds Ratio (OR)*	*t (df)*	*p*
Model for writing proficiency (β_0)				
Intercept (γ_{00})	.74 (.06)	2.10	13.16 (282)	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.62**	282	1169.40

Intraclass correlation coefficient	.16
Reliability	.69

* $p < .05$. ** $p < .01$.

Urban districts. Table 4.6 presents the results for the fully unconditional model for writing proficiency for children in urban districts. The log odds for a child being proficient in writing in an urban district is 1.42, corresponding to an estimated odds, exp. 1.42, of 4.14 and an estimated probability, $P\left(R_{ij}=1\right)$, of .81. That is, 81% of children in an average urban district successfully completely the proficiency task in writing. The

ICC for writing proficiency is .19 and the estimate of the variance is significantly different from zero, τ_{00} = .77, p < .001.

Table 4.6 Results for Fully Unconditional Model for Writing Proficiency in Urban Districts

Fixed Effects	*Coefficient (SE)*	*Odds Ratio (OR)*	*t (df)*	*p*
Model for writing proficiency (β_0)				
Intercept (γ_{00})	1.42 (.08)	4.14	17.97 (216)	<.001

Random Effects (Var. Components)	*Variance*	*Df*	*Chi-square*
Variance in intercepts (τ_{00})	.77**	216	613.47

Intraclass correlation coefficient	.19
Reliability	.57

* $p < .05$. ** $p < .01$.

Summary.

Reading, arithmetic and writing functionings are higher for children who live in urban districts than for children who live in rural districts. The percentage of children who scored at the highest level of proficiency in reading, arithmetic, and writing was 44%, 30% and 80%, respectively, in urban districts, compared to 31%, 18% and 68%, respectively, in rural districts. These percentages, however, varied across districts, with higher and lower percentages of children in some rural and urban districts attaining the highest level of proficiency. Overall, the results from the fully unconditional models indicate that multilevel analyses are appropriate for these data. The reading, arithmetic, and writing functionings of children vary significantly within and between districts in both rural and urban settings.

Within-District Models

Based on the finding that children's reading, arithmetic, and writing proficiency scores vary across districts, the next step in the HLM analysis is to construct a within-district model that specifies the child variables at Level 1 but does not include any Level-2 district variables. The within-district model examines relationships between the three functionings and child-level characteristics, with the child serving as the unit of analysis. As discussed in Chapter 3, the primary child-level variable of interest in the dissertation is the child's gender, with other variables including household characteristics and educational experiences serving as control variables.

In these models, gender is group-mean centered and includes a random effect. The coefficient for gender indicates whether there is a difference between boys and girls in a particular proficiency (top panel in the tables, under random effects), and the variance estimate for the coefficient indicates whether the coefficient varies across districts (bottom panel in the tables, under variance components). All other variables in the models are grand-mean centered and fixed (without a random effect). Results for children living in rural districts are presented in the second and third columns of the table, which provide the log odds, standard errors, and odds ratio for the gamma coefficients, respectively. Similarly, the fourth and fifth columns of the table provide these same statistics for the gamma coefficients for children living in urban districts.

I report both log odds and the odds ratio. Positive log odds are associated with higher levels of proficiency while negative log odds are associated with lower levels of proficiency. The odds ratio is the exponentiated value or antilog of the log odds (exp γ_{qq}), and it is somewhat easier to interpret. In general, odds ratios greater than one

indicate an increase in the likelihood of being proficient while odds ratios less than one indicate a decrease in the likelihood of being proficient. Because an odds ratio of 1.0 is equivalent to a 50:50 chance of an event occurring, deviations from 1.0 can be interpreted as a percentage change in the likelihood of an event – in this case, being at a higher or lower level of proficiency. In other words, an odds ratio of 2.0 indicates that a child is twice or 100% more likely to be proficient while an odds ratio of .50 would indicate that a child is half or 50% less likely to be proficient.

Within-district model – reading proficiency.

Table 4.7 displays the results for the within-district models for reading proficiency for children living in rural and urban districts. The coefficients estimate the likelihood that children in each area scored at the highest level of proficiency – or, more generally, that children scored at any higher level of proficiency compared to a lower level of proficiency in reading. I report the results for the rural model first followed by the urban model.

Rural districts. The primary variable of interest is gender. The log odds indicate that, on average, girls were less likely than boys to score at higher levels of proficiency. More specifically, girls were 23% less likely than boys to do so, and the variance component (at the bottom of the table) for gender's random effect indicates that this gap in proficiency varies significantly across the rural districts, τ_{11} = .13, p > .001. In some districts the gap is greater while in other districts the gap is smaller.

Table 4.7 Within-District Hierarchical Linear Model for Reading Proficiency for Rural and Urban Districts

	Rural			*Urban*		
Independent Variable	*Gamma Coefficients (SE)*		*Odds Ratio*	*Gamma Coefficients (SE)*		*Odds Ratio*
Intercept	-1.03**	(.05)	.36	-.34**	(.06)	.71
Random effects:						
Gender gap	-.26**	(.05)	.77	.07	(.07)	1.07
Fixed effects:						
Demographics						
AGE (γ_{140})	.15**	(.02)	1.16	.17**	(.04)	1.19
OBC (γ_{60})	-.52**	(.12)	.59	-.27	(.15)	.76
SC (γ_{70})	-.73**	(.13)	.48	-.48**	(.16)	.62
ST(γ_{80})	-.75**	(.15)	.48	-.57*	(.25)	.57
OTHER CASTES (γ_{90})	-.45**	(.13)	.64	-.22	(.15)	.80
MUSLIM (γ_{40})	-.34**	(.08)	.71	-.35**	(.10)	.70
OTHER REL. (γ_{50})	.13	(.11)	1.13	.35*	(.17)	1.42
Household						
1 or 2 CHILDREN IN HOUSEHOLD (γ_{170})	.09	(.06)	1.09	.16*	(.08)	1.17
4 or MORE CHILDREN IN HOUSEHOLD (γ_{180})	-.16**	(.05)	.85	-.34**	(.09)	.71
HIFED0 (γ_{10})	-.29**	(.06)	.75	-.37**	(.11)	.69
HIFEDG (γ_{20})	.30**	(.07)	1.35	.29**	(.10)	1.34
HOUSEHOLD ASSETS (γ_{160})	.45**	(.04)	1.57	.52**	(.06)	1.68
Educational Experiences						
GRADE (γ_{150})	.56**	(.02)	1.75	.47**	(.03)	1.60
CURRENTLY ENROLLED(γ_{100})	.09	(.08)	1.09	.29**	(.11)	1.33
EVER REPEATED (γ_{110})	-.33**	(.07)	.72	-.44**	(.12)	.64
TEACHER PRESENT (γ_{120})	.32**	(.12)	1.34	.69**	(.26)	1.99
CHILD ENJOYS SCHOOL	.95**	(.08)	2.59	.72**	(.14)	2.05

(γ_{130})

Table 4.7 (cont.)

	Rural		*Urban*	
Independent Variable	*Gamma Coefficients (SE)*	*Odds Ratio*	*Gamma Coefficients (SE)*	*Odds Ratio*
For thresholds:				
δ_2	1.23** (.03)	3.42	1.42** (.04)	4.14
δ_3	2.6** (.04)	13.46	2.69** (.06)	14.59
δ_4	3.93** (.05)	50.90	4.17** (.10)	64.72

Random effects (Variance Components)

	Rural				*Urban*			
	Var.	*Df*	*Chi-square*	*Reliability of district-level random effects*	*Var.*	*Df*	*Chi-square*	*Reliability of district-level random effects*
Average reading proficiency	.47**	273	1270.17	.72	.44**	207	570.55	.59
Gender gap	.13**	273	355.31	.19	.06	207	209.99	.06

Note: The reference groups excluded from the analysis are: Highest level of female education in the household (primary level), Religion (Hindu), Caste (Brahmin), and number of children in the household (three).
* $p < .05$. ** $p < .01$.

As for the fixed effects (the coefficients below the estimate for the gender gap), there are differences in proficiency given children's demographic characteristics, family and household characteristics and educational experiences. Older children were 16% more likely to score at a higher level of proficiency than younger children. Children were less likely to be proficient if they were Muslim, and belonged to OBC, SC, ST or Other castes. The odds ratios for these variables indicate that Muslim children were 29% less

likely than Hindu children to score at a higher level of proficiency, and children from non-Brahmin castes were between 36% and 52% less likely to attain the same level of proficiency as Brahmin children.

Children that came from smaller families, families with more educated adult females, and households with greater assets were also more likely to score at a higher proficiency level. Although there was no difference in proficiency levels between children from families with three children (the modal family size) and children from families with fewer children, children from families with four or more children were 15% less likely to score at a higher proficiency level than children from smaller families. Children from families with adult females who had no education were 25% less likely to score at a higher level than children from families with adult females who had at least some primary education (grades one through five); furthermore, children from families with adult females who had more than a 5^{th} grade education were 35% more likely to score at a higher level of proficiency than children from families with adult females who had less education. Finally, children from households with more assets were 57% more likely to score at a higher level of proficiency than children from households with fewer assets.

Children with more favorable educational experiences also had higher levels of proficiency in reading, with the exception of whether a child was currently enrolled in school. The largest coefficient was for whether children enjoyed school. Children who said that they enjoyed school were more than twice as likely (odds ratio = 2.59) to score at a higher proficiency level than children who said that they did not. Children in higher grades and children attending schools where the teacher was typically present were also

more likely to score higher on the reading assessment, 16% and 34% more likely, respectively. On the other hand, children who repeated a grade were 28% less likely to score at a higher level of proficiency compared to children who had never repeated a grade.

Urban districts. Unlike in rural districts, there is no gender gap in the reading proficiency of children living in urban districts. On average, girls scored at the same level of proficiency as boys. Moreover, the estimate of the variance in the gender gap is not significant, indicating that the gap, which is statistically equal to zero, is about the same in every urban district in the sample. Whereas there is a gender gap in reading proficiency in rural districts, there is no gap in urban districts.

The fixed effects for reading proficiency in urban districts indicate that most children's demographic characteristics were associated with their likelihood of scoring at a higher level of proficiency. Specifically, children were 19% more likely to be in a higher level of proficiency if they were older. Muslim children were 30% less likely than Hindu children to score at a higher proficiency level while children from other religious backgrounds were 42% more likely to score at a higher proficiency level than Hindu children. Unlike in rural districts, only children from ST and SC castes were less likely to score at higher levels of proficiency than Brahmin children, 38% and 48% less likely, respectively.

Children from smaller families, families with adult females with higher levels of educational attainment and households with greater assets were more likely to score at higher levels of proficiency. Coefficients are similar to those reported for rural children. Children from families with fewer than three children were 17% more likely than

children from families with three children to score at higher levels while children from families with four or more children were 29% less likely to score at higher levels. Children from families with adult females who had no education were 31% less likely to score at higher levels of proficiency compared to children from families with adult females who had at least some primary education; children from families with adult females with more than five years of education were even more likely to score at a higher proficiency level, the increase being 34% compared to children from families with an adult female with some primary education. Predictably, children were also more likely to have higher levels of proficiency if they came from households with more assets. Children from households with more assets were 68% more likely to score at a higher level of proficiency in reading than children from households with fewer assets.

Children in urban districts with more positive educational experiences also had higher levels of proficiency, just as children did in rural districts. Children who enjoyed school and children who attended school where a teacher was typically present were roughly twice as likely to score at a higher proficiency level compared to children who did not enjoy school or had frequently absent teachers (odds ratios = 2.05 and 1.99, respectively). Children at higher grades were 60% more likely to score at higher levels, and children currently enrolled in school, unlike in rural districts, were 33% more likely to score at higher levels. Children who repeated one or more grades, on the other hand, were 36% less likely to score at a higher level of reading proficiency, similar to children who had repeated a grade in rural districts.

Within-district model – arithmetic proficiency.

Table 4.8 provides the results for the within-district models for arithmetic proficiency for children living in rural and urban districts. The coefficients estimate the

likelihood that children in each area scored at the highest level of proficiency, though, as with reading proficiency, coefficients can be more generally interpreted as the likelihood that children scored at any higher level of proficiency compared to a lower level of proficiency. I report the results for the rural model first and the urban model second.

Rural districts. Girls were less likely than boys to score at a higher proficiency level in arithmetic in rural districts. On average, in the rural districts in the sample, girls were 33% less likely to score at a higher level compared to boys, a slightly larger gap than reported for reading proficiency in rural districts. Moreover, as indicated by the variance component in the lower panel of the table, the gender gap in arithmetic proficiency varies across rural districts, $\tau_{11} = .12$, $p > .001$. In some districts the gap is larger whereas in other districts the gap is smaller.

Level-1 fixed effect gamma coefficients follow the result for the gender gap. Older children were 17% more likely to score at a higher proficiency level than young children. However, Muslim children were 30% less likely to score at a higher level than Hindu children, and OBC, SC, ST and Other Castes were 42%, 55%, 57%, and 34%, respectively, less likely to score at a higher level of proficiency in arithmetic than Brahmin children.

Table 4.8 Within-District Hierarchical Linear Model for Arithmetic Proficiency for Rural and Urban Districts

	Rural			*Urban*		
Independent Variable	*Gamma Coefficients (SE)*		*Odds Ratio*	*Gamma Coefficients (SE)*		*Odds Ratio*
Intercept	-1.90**	(.06)	.15	-1.11**	(.08)	.33
Random effects:						
Gender gap	-.40**	(.05)	.67	-.10	(.07)	.90
Fixed effects:						
Demographics						
AGE (γ_{140})	.16**	(.02)	1.17	.25**	(.04)	1.28
OBC (γ_{60})	-.53**	(.12)	.58	-.43**	(.14)	.65
SC (γ_{70})	-.79**	(.12)	.45	-.65**	(.16)	.52
ST(γ_{80})	-.85**	(.15)	.43	-.54*	(.25)	.58
OTHER CASTES (γ_{90})	-.42**	(.12)	.66	-.27	(.15)	.76
MUSLIM (γ_{40})	-.35**	(.09)	.70	-.48**	(.10)	.62
OTHER REL. (γ_{50})	.19	(.11)	1.20	.06	(.17)	1.06
Household						
1 or 2 CHILDREN IN HOUSEHOLD (γ_{170})	.08	(.06)	1.08	.20*	(.08)	1.22
4 or MORE CHILDREN IN HOUSEHOLD (γ_{180})	-.19**	(.05)	.83	-.29**	(.09)	.75
HIFED0 (γ_{10})	-.22**	(.06)	.81	-.28**	(.11)	.76
HIFEDG (γ_{20})	.43**	(.07)	1.54	.28**	(.11)	1.32
HOUSEHOLD ASSETS (γ_{160})	.47**	(.04)	1.60	.73**	(.06)	2.08

Table 4.8 (cont.)

	Rural			*Urban*		
Independent Variable	*Gamma Coefficients (SE)*		*Odds Ratio*	*Gamma Coefficients (SE)*		*Odds Ratio*
Educational Experiences						
GRADE (γ_{150})	.52**	(.02)	1.68	.46**	(.03)	1.58
CURRENTLY ENROLLED(γ_{100})	.13	(.08)	1.13	.31**	(.12)	1.36
EVER REPEATED (γ_{110})	-.39**	(.07)	.68	-.50**	(.12)	.61
TEACHER PRESENT (γ_{120})	.30**	(.12)	1.35	.45	(.27)	1.57
CHILD ENJOYS SCHOOL (γ_{130})	.81**	(.09)	2.25	.81**	(.15)	2.25
For thresholds:						
δ_2	1.64**	(.03)	5.16	2.01**	(.05)	7.46
δ_3	3.85**	(.05)	46.99	4.21**	(.09)	67.36

Random effects (Variance Components)

	Rural				*Urban*			
	Var.	*Df*	*Chi-square*	*Reliability of district-level random effects*	*Var.*	*Df*	*Chi-square*	*Reliability of district-level random effects*
Average arithmetic proficiency	.56**	273	1482.28	.75	.72**	207	842.62	.70
Gender gap	.12**	273	329.32	.17	.10*	207	241.63	.09

Note: The reference groups excluded from the analysis are: Highest level of female education in the household (primary level), Religion (Hindu), Caste (Brahmin), and number of children in the household (three).
* $p < .05$. ** $p < .01$.

Family size, adult female education and household assets also predicted arithmetic proficiency. Although there was no difference in the proficiency level of children from the smallest two categories of family size, children from families with four

or more children were 15% less likely to score at a higher level than children from smaller families. Children from families with adult females who had no education were 25% less likely to score at a higher level of proficiency than children from families with adult females who had some primary education; and children from families with adult females who had more than a fifth-grade education were 35% more likely to score at a higher level than children from families with adult females with less education. Children from families with greater assets were 57% more likely to score at a higher level than children from families with fewer assets.

Children with more favorable educational experiences also scored higher than children with less favorable experiences. Children who enjoyed school had the largest coefficient, with an increased likelihood of scoring at a higher level of proficiency equal to 125%. Children in higher grades and children attending schools where the teacher was typically present were 68% and 35% more likely to score at higher levels whereas children who had repeated a grade were 32% less likely to score at higher levels. There was no association between being currently enrolled in school and proficiency in arithmetic for children in rural districts.

Urban districts. Although the results in Table 4.8 indicate a gender gap for proficiency in arithmetic for children in rural areas, there is no gap for children in urban areas. On average, girls are as likely as boys to score at a higher level of proficiency in these districts. Nonetheless, while the estimate for the average gap across districts is statistically equal to zero, the variance component in the bottom panel of the table indicates that the estimate varies across urban districts, τ_{11}= .10, p > .05. In other words,

in some urban districts the gap is smaller and in others larger, including the possibility of a statistically significant gap in some districts.

For the fixed effects, age, religion and caste are all statistically significant. Older children were 28% more likely to score at higher proficiency levels than young children. Muslim children were 38% less likely than Hindu children to score at higher levels. Similarly, OBC, SC, and ST children were 35%, 48% and 42%, respectively, less likely to score at higher levels of arithmetic proficiency than Brahmin children. These results are similar to those reported for children in rural districts.

Children from smaller families, families with higher levels of adult female education and households with greater assets were again significant predictors of children's likelihood to be proficient in arithmetic. Children from families smaller than the modal family size of three children were 22% more likely to score at higher levels while children from families larger than the modal family size were 25% less likely to score at higher levels. Children from families with adult women with no education were 24% less likely and children from families with adult women with more than a fifth-grade education were 32% more likely to score at higher levels of proficiency than children from families with adult women who had at least some primary education. Finally, children from households with more assets were twice as likely (odds ratio = 2.08) of scoring at a higher level of proficiency than children from household with fewer assets.

Children's educational experiences were also associated with their arithmetic proficiency in urban districts. Enjoying schools was the strongest predictor of proficiency, with children who enjoyed school being 125% more likely to score at higher levels than children who did not enjoy school. Children in higher grades and were 58%

more likely than children in lower grades to score at a higher level while children who had repeated a grade were 39% less likely to score at a higher level than students who had never repeated a grade. Two exceptions to the rural model are the coefficients for currently enrolled and whether a teacher is typically present at school. Currently enrolled children were 36% more likely to score at higher levels of proficiency in arithmetic while the presence of a teacher was not statistically significant.

Within-district model – writing proficiency.

I present the results of the analyses investigating the relationship between child-level variables and the likelihood of high proficiency in writing in Table 4.9. Because writing proficiency is a binary variable, coefficients indicate the likelihood of a child being proficient or not – that is, being able to write his or her name and a simple sentence with two or fewer mistakes. As with the other proficiencies, I present the results for the rural model first followed by the results for the urban model.

Rural districts. On average, boys were more likely than girls to complete successfully the writing task. Boys were 22% more likely to be proficient than girls in rural districts. However, this gap in proficiency did not vary across districts, as the variance component in the bottom panel for the gender's random effect is essentially zero. In other words, although there is a gender gap in writing proficiency, the gap is the same across rural districts in the sample.

As for the demographic characteristics of children, older children were more likely to complete the writing task successfully than younger children. On average, older children were 16% more likely to be proficient in writing than younger children, and Muslim children were 24% less likely than Hindu children to be proficient in writing. Other religions and caste were unrelated to proficiency. There was no difference in the

performance of Hindu children and children from Other religions, and children from OBC, SC, ST and Other castes were as likely to be proficient in writing as children from the Brahmin caste.

Table 4.9 Within-District Hierarchical Linear Model for Writing Proficiency for Rural and Urban Districts

	Rural			*Urban*		
Independent Variable	*Gamma Coefficients (SE)*		*Odds Ratio*	*Gamma Coefficients (SE)*		*Odds Ratio*
Intercept	.85**	(.06)	2.34	1.71**	(.09)	5.53
Random effects:						
Gender gap	-.25***	(.06)	.78	-.09	(.10)	.91
Fixed effects:						
Demographics						
AGE (γ_{140})	.15**	(.03)	1.16	.07	(.05)	1.07
OBC (γ_{60})	-.21	(.16)	.81	.13	(.21)	1.14
SC (γ_{70})	-.25	(.17)	.78	-.01	(.23)	.99
ST(γ_{80})	-.34	(.19)	.71	-.04	(.34)	.96
OTHER CASTES (γ_{90})	-.08	(.17)	.92	.33	(.22)	1.39
MUSLIM (γ_{40})	-.28**	(.11)	.76	-.41**	(.14)	.66
OTHER REL. (γ_{50})	.08	(.14)	1.08	.04	(.26)	1.04
Household						
1 or 2 CHILDREN IN HOUSEHOLD (γ_{170})	.01	(.07)	1.01	.16	(.12)	1.17
4 or MORE CHILDREN IN HOUSEHOLD (γ_{180})	-.24**	(.07)	.79	-.36**	(.13)	.70
HIFED0 (γ_{10})	-.29**	(.08)	.75	-.28*	(.13)	.76
HIFEDG (γ_{20})	.51**	(.10)	1.66	.49**	(.15)	1.63
HOUSEHOLD ASSETS (γ_{160})	.37**	(.05)	1.45	.38**	(.08)	1.46

Table 4.9 (cont.)

	Rural			*Urban*		
Independent Variable	*Gamma Coefficients (SE)*		*Odds Ratio*	*Gamma Coefficients (SE)*		*Odds Ratio*
Educational Experiences						
GRADE (γ_{150})	.43**	(.02)	1.54	.42**	(.04)	1.52
CURRENTLY ENROLLED(γ_{100})	.02	(.10)	1.02	.49**	(.15)	1.63
EVER REPEATED (γ_{110})	-.46**	(.09)	.63	-.43**	(.15)	.65
TEACHER PRESENT (γ_{120})	.57**	(.15)	1.77	.29	(.35)	1.34
CHILD ENJOYS SCHOOL (γ_{130})	.73**	(.10)	2.08	.58**	(.19)	1.78

Random effects (Variance Components)

	Rural				*Urban*			
	Var.	*Df*	*Chi-square*	*Reliability of district-level random effects*	*Var.*	*Df*	*Chi-square*	*Reliability of district-level random effects*
Average writing proficiency	.61**	273	1057.69		.76**	207	527.03	.54
Gender gap	.03	273	253.67		.05	207	172.02	.03

Note: The reference groups excluded from the analysis are: Highest level of female education in the household (primary level), Religion (Hindu), Caste (Brahmin), and number of children in the household (three).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Family and household characteristics of children in rural districts were related to writing proficiency in rural districts. Children were more likely to be proficient if they came from smaller families, from families with adult females who had higher levels of education and from households with greater assets. Children from families with four or more children were 21% less likely to be proficient in writing than children from smaller

families. Children from families with adult females with no schooling were 25% less likely to be proficient than children from families with an adult female who had at least some primary education; and children from families with an adult female with more than a fifth grade education were 66% more likely to be proficient than children from families with a female adult with no more than a primary education. Finally, children from households with greater assets were 45% more likely to be proficient in writing than children from households with fewer assets.

Although current enrollment was not related to being proficient in writing, all of the other variables that tapped educational experiences were statistically significant. Children who enjoyed school were twice (log odds = 2.08) as likely to be proficient than children who did not enjoy school; children who attended a school where the teacher was typically present were 77% more likely to be proficient; and children in higher grades were 54% more likely to be proficient than children in lower grades. Children who had repeated a grade were 37% less likely to be proficient in reading than children who had not.

Urban districts. Unlike in rural districts, there is no gender gap in writing proficiency in urban districts. Girls were as likely as boys to complete the writing task successfully. Moreover, as reported in the variance components in the bottom panel of the table, the gap does not vary across urban districts. Regardless of the district in which urban children lived, girls were as likely as boys to be proficient in writing.

As in rural districts, Muslim children in urban districts were less likely to be proficient than Hindu children. On average, Muslim children were 34% less likely to complete successfully the writing task than Hindu children. However, none of the other

demographic characteristics were related to writing proficiency. Older children were as likely as younger children to complete the task successfully; children from other religious backgrounds were as likely as Hindu children to be proficient; and children from each of the non-Brahmin castes were as likely to be proficient in writing as Brahmin children.

Children from smaller families, families with more highly educated adult females and households with greater assets were more likely to be proficient, just as were their counterparts in rural districts. Children from families with four or more children were 30% less likely to be proficient than children from smaller families, and children from families with adult females who had no education were 24% less likely to be proficient than children from families with an adult female who had at least some primary education. Children from families with at least one adult female who had attained more than a fifth-grade education were 63% more likely to be proficient than children from families with adult females who had not progressed beyond primary education. Similarly to children in rural districts, children from households with greater assets were 46% more likely to be proficient than children from households with fewer assets.

The strongest predictor of whether children were proficient in writing in urban settings was the same as in rural settings – whether the child enjoyed school. Children who enjoyed school were 78% more likely to be proficient than children who did not enjoy school. Children in higher grades were also more likely to be proficient than children in lower grades, the difference being a 52% increase in the likelihood of being proficient, and children who had repeated a grade were 36% less likely to be proficient than children who had never repeated a grade. However, unlike in the rural model, whether a teacher was typically present was unrelated to proficiency, and whether the

child was currently enrolled was related to proficiency. Children who were currently enrolled in school were 63% more likely to be proficient in writing than children who were not enrolled in school in urban areas.

Summary.

The primary focus of this study is whether there is a gender gap in educational functionings, as measured by proficiencies in reading, arithmetic, and writing, and whether variations in the gap across districts might be explained by differences in the contextual capabilities associated with the districts where children live. I found significant gaps in proficiencies for all three dependent variables, but only for children living in rural areas. The gap was largest for proficiency in arithmetic and about the same magnitude for proficiencies in reading and writing. In each of these cases, the gap varied across districts.

Although the gender gap in arithmetic proficiency was, on average, zero, in urban districts, the gap also varied across districts, indicating that gender differences in proficiencies might be explained by the characteristics of the urban districts in which children lived. In subsequent models, I examine whether the variation in the gender gap identified by the within-district models varies as a function of district differences in the contextual capabilities. These models include the rural models for all three proficiencies and the urban model for arithmetic proficiency.

Demographic variables had similar results in the rural and urban within-district models. Children's age was consistently and positively associated with a higher likelihood of proficiency in all of the models, with the exception of the urban model for writing. Hindu children also outperformed Muslim children in all of the models. Children from Other religions performed about the same as Hindu children, the one

exception being an increased likelihood of higher levels of reading proficiency in urban districts. While caste was unrelated to writing proficiency, it was consistently and negatively associated with proficiency in reading and arithmetic, especially for SC and ST children. OBC and OC children scored at lower levels of proficiency but, primarily, in rural settings.

Family characteristics were relatively comparable in rural and urban models, though there was some indication that family size may be more influential in urban settings than in rural settings. Nonetheless, families with four or more children were negatively associated with proficiency in all of the models. Children from families with at least one adult female who had attained some primary education outperformed children who came from families with adult females with no schooling, and children who came from families with at least one adult female who had attained an education beyond the fifth grade outperformed children who came from families with adult females who had achieved less education. Children who came from households with more assets had higher levels of proficiency than children who came from households with fewer assets, regardless of the model.

Favorable school experiences were also associated with proficiency levels, though there were some differences in the models. Whether a child was enrolled in a school was related to proficiency levels, but only in urban areas. Whether a teacher was typically present was associated positively with proficiency levels in rural districts but not in urban districts, with the exception of the model for reading proficiency. Children in higher grades out performed children in lower grades in all of the models, as did children who had never repeated a grade compared to children who had repeated a grade. Whether a

student enjoyed school was positively related to proficiency levels in all of the models, and it was also the strongest predictor of proficiency levels in all of the models.

Fully Conditional Models

The fully conditional models help determine whether there is a relationship between the three education functionings of reading, arithmetic, and writing proficiency and the contextual capabilities after controlling for children's demographics, family and household characteristics, and school experiences. These models also examine whether the gender gap in reading and arithmetic proficiencies might be explained by differences in the contextual capabilities associated with rural and, in the case of arithmetic proficiency, urban districts.

In the models that examine variation in the gender gap associated with reading and arithmetic proficiencies, I group-mean center gender and include its random effect. In all other models, gender is grand-mean centered and fixed – that is, I specify the gender gap as being constant across districts. All other variables in the models are grand-mean centered, such that statistically significant coefficients at the district level are irrespective of any differences in the demographic characteristics, family and household characteristics, and children's educational experiences in rural and urban districts.

I present the results for reading, arithmetic and writing proficiencies in Tables 4.10, 4.11 and 4.12. These tables present the same statistics for the gamma coefficients as the prior tables – namely, the log odds of being proficient at a higher level compared to a lower level and the corresponding standard error and odds ratio. As before, I present results separately for rural and urban districts. However, for each of these models, I present two submodels, A and B. Submodel A includes all six of the contextual

capabilities – life, bodily health, affiliation, bodily integrity, political empowerment, and female educational attainment. Submodel B includes the same variables with the addition of average household assets, used in this study as a control for districts with different financial resources. In models that include a random effect for gender, I specify the same models for the overall intercept (i.e., the average likelihood of scoring at a higher level of proficiency) and the intercept for the gender gap (i.e., the difference between boys and girls in the likelihood of scoring at a higher level of proficiency).

Due to only minor changes to the within- or Level-1 coefficients when I specified the fully conditional models, I present only the results for the Level-2 or district models in these tables. These tables provide results for the district models for the overall intercept (upper panel) and for the intercept for the gender gap (lower panel).

Fully conditional model – reading proficiency.

Table 4.10 presents the results for the conditional models for reading proficiency for children living in rural and urban districts. The coefficients estimate the likelihood that children in each area scored at any higher level of proficiency compared to a lower level of proficiency in reading. I report the results for the rural model first followed by the urban model. Within these models I begin with the results for the overall intercept and, when appropriate, discuss the results for the gender gap next.

Rural districts. The intercept for Model B similar to the intercept for Model A, is γ_{00} = -1.02 (p< .001), and the estimated odds for a child in rural districts are exp (-1.02), are .29. According to this, on average, it was less likely for children in rural districts to score at the higher levels of reading proficiency. More specifically, children were 64% less likely to score at the higher levels of reading proficiency than the lower levels. But, the estimated odds for a child in the rural districts were not affected by any of the six

contextual capabilities. In other words, differences among districts in the likelihood of scoring at a higher level of reading proficiency cannot be explained by differences in the contextual capabilities among districts.

As regards the gender gap, results of both Model A and B show that on average, in the rural districts in the sample, the estimated odds of a girl scoring at the higher reading proficiency level than boys tended to be lower as gender has a negative and statistically significant effect on the log odds for proficiency γ_{10} = -.22 ($p < .001$), with an odds ratio exp (-.22) = .80. That is, compared to boys, the likelihood of girls reaching higher levels of reading proficiency were 20% less, holding other effects constant. However, the estimated odds of girls tended to improve, that is the gender gap was reduced, when, according to Model A, girls lived in districts that that were higher on the capabilities of political empowerment and education. Specifically, girls in districts with higher political empowerment were 11% more likely and those in districts with higher adult female education were 23% more likely to be in the higher levels of reading proficiency. Interestingly, the gender gap was exacerbated in districts that were higher on the life capability by 13 percent.

In Model B, with the addition of the control variable of household assets, even though the intercept and the gender gap remained largely unchanged, the influence of the capabilities of life and education were explained away. Additionally, girls residing in districts with higher contextual capabilities of bodily integrity were 13% more likely to score in the higher levels of reading proficiency as were those who resided in districts with higher political empowerment.

Table 4.10 Between-District Hierarchical Linear Model Estimating Capabilities for Reading in Rural and Urban Districts

Random Effect	*Rural*						*Urban*					
	Model A			Model B			Model A			Model B		
	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio
Reading Proficiency:												
Intercept	-1.02***	(.05)	.36	-1.02***	(.05)	.36	-.35***	(.06)	.70	-.35***	(.06)	.70
LIFE2Z	.01	(.06)	1.01	.00	(.06)	.99	-.02	(.06)	.98	.00	(.06)	1.00
BODHE5Z	-.09	(.05)	.91	-.08	(.05)	.92	-.20***	(.07)	.83	-.23***	(.07)	.79
AFF1Z	.04	(.05)	1.04	.05	(.06)	1.05	.06	(.07)	1.08	.06	(.07)	1.06
BOIN1Z	.06	(.06)	1.06	.05	(.06)	1.04	.10	(.06)	1.11	.12*	(.06)	1.13
POLEM1Z	.07	(.06)	1.07	.06	(.05)	1.06	-.19**	(.06)	.82	-.20**	(.06)	.82
HIFEDGZ	.10	(.07)	1.11	.16	(.09)	1.92	.07	(.09)	1.07	-.03	(.44)	.97
HHASSZ				-.14	(.12)	.87				.31	(.19)	1.36
Gender Gap:												
Mean	-.22***	(.05)	.80	-.22***	(.05)	.72						
LIFE2Z	-.14*	(.06)	.87	-.11	(.06)	.89						
BODHE5Z	.08	(.05)	1.08	.06	(.04)	1.06						

Table 4.10 (contd.)

AFF1Z	.01	(.05)	1.01	-.01	(.06)	.99
BOIN1Z	.09	(.06)	1.09	.13*	(.06)	1.13
POLEM1Z	.11*	(.06)	1.11	.13*	(.05)	1.13
HIFEDGZ	.21**	(.07)	1.23	.08	(.09)	1.08
HHASSZ				.31**	(.12)	1.36
For Thresholds:						
δ_2	1.23***	(.03)		1.23***	(.02)	
δ_3	2.60***	(.04)		2.60***	(.04)	
δ_4	3.94***	(.05)		3.94***	(.05)	

Random effects (Variance Components)																
	Rural								*Urban*							
	Model A				Model B				Model A				Model B			
	Var	*Df*	χ^2	τ	*Var.*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ
Average reading proficiency	.46***	266	1208.76	.74	.46***	266	1208.76	.72	.34***	210	485.12	.52	.33***	209	479.27	.52
Gender gap	.04*	266	307.35	.11	.04*	266	307.35	.08	--	--	--	--	--	--	--	--

τ = Reliability of district-level random effects. * $p < .05$. ** $p < .01$. *** $p < .001$.

Each of these capabilities reduced the gender gap in reading proficiency between boys and girls. Similarly, girls in districts characterized with greater household assets were almost 36% more likely to score in the higher levels of reading proficiency than those who did not.

Urban districts. Table 4.10 also presents the fully conditional model for reading proficiency in urban districts. Results of Model A and B show the intercept γ_{00} = - .35 ($p < .001$) and the estimated odds for a child as exp. (-.35) = .70. Similar to rural districts, on an average it was less likely (30%) for children in urban districts to be scoring at higher levels of reading proficiency than the lower ones. As for the relationship of the six contextual capabilities with average reading proficiency, results in urban districts show mixed findings. Unlike in the rural districts where the contextual capabilities were not associated with reading proficiency, in both Models A and B in the urban districts, two contextual capabilities (bodily health and political empowerment) were negatively related to reading proficiency while one contextual capability (bodily integrity) in Model B was positively related to reading proficiency. In other words, contrary to expectations, on average the estimated odds, and thus, the predicted probability of reading proficiency, tended to decrease for those children who resided in urban districts characterized by high bodily health (by almost 21%) and political empowerment (by almost 18%) than those who did not. On the other hand, the estimated log odds for scoring at higher levels of reading proficiency, for children who resided in urban districts characterized by high bodily integrity tended to increase by almost 13%.

Unlike in rural districts, there was no gender gap in reading proficiency in urban districts. Thus, this slope was not modeled and girls were as likely as boys to score at higher levels of reading proficiency in urban districts.

Fully conditional model – arithmetic proficiency.

Table 4.11 provides the results for the fully conditional models for arithmetic proficiency for children living in rural and urban districts. The coefficients estimate the likelihood that children in each area scored at a higher level of proficiency compared to a lower level of proficiency in arithmetic. I report the results for the rural model first and the urban model second. Within these models I begin with the results for the overall intercept and, when appropriate, discuss the results for the gender gap next.

Rural districts. Similar to reading proficiency for Model B, which controlled for district average household assets, results (γ_{00} = - 1.90; p < .001) revealed that children in rural districts were 86% less likely to score at higher arithmetic proficiency levels than the lower ones. The intercept for the final model – Model B, was only marginally different from that for Model A (γ_{00} = - 1.89; p < .001). As seen in Table 4.11, the contextual capability of affiliation has a positive main effect on the average estimated odds for a child in the rural district scoring at a higher level of proficiency in arithmetic. That is, the likelihood of scoring higher on the assessment was higher for children who resided in rural districts with higher levels of affiliation by 16%. Bodily integrity also increased the likelihood of higher levels of proficiency in rural districts in Model A, but, after controlling for household assets the coefficient was no longer statistically significant.

As regards the gender gap, similar to reading proficiency in rural districts, girls were less likely than boys to score at a higher proficiency level in arithmetic proficiency.

On average, in the rural districts in the sample, girls were 34% less likely to score at higher levels of arithmetic proficiency compared to boys, a slightly larger gap than reported for reading proficiency in rural districts.

Coefficients of contextual capabilities modeled on the gender gap slope show that for Model A, the estimated odds of a girl scoring at the higher levels of arithmetic proficiency tended to improve for girls residing in districts with higher levels of political empowerment and higher levels of adult female education. Specifically, girls tended to do better by 15% in districts with high political empowerment and 19% better in districts with education.

Coefficients of contextual capabilities modeled on the gender gap slope for Model B show that, political empowerment continued to retain its impact in reducing the gender gap even after the addition of the control variable: household assets. Additionally, the contextual capability of bodily integrity also emerged as a significant capability in reducing the gender gap in arithmetic proficiency. Girls tended to do better by 16% in districts that were higher on bodily integrity. Girls, in districts with greater material resources, that is, districts high on household assets, were likely to be in the higher levels of arithmetic proficiency by 39% compared to other girls in rural districts.

Urban districts. Table 4.11 also shows the results for the fully conditional models for the urban district. Models A and B for arithmetic proficiency in urban districts were not starkly different and so I discuss mainly the final Model B in this section.

Table 4.11 Between-District Hierarchical Linear Model Estimating Capabilities for Arithmetic in Rural and Urban Districts

Random Effect	*Rural*						*Urban*					
	Model A			Model B			Model A			Model B		
	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio	Gamma coefficient	(SE)	Odds ratio
Arithmetic Proficiency:												
Intercept	-1.89***	(.06)	.15	-1.90***	(.13)	.14	-1.13***	(.07)	.32	-1.12***	(.06)	.30
LIFE2Z	-.04	(.06)	.96	-.04	(.06)	.96	-.05	(.06)	.95	-.08	(.07)	.92
BODHE5Z	-.09	(.05)	.91	-.10	(.05)	.90	-.22**	(.08)	.80	-.19*	(.08)	.83
AFF1Z	.15**	(.06)	1.19	.15*	(.06)	1.16	.16*	(.07)	1.17	.15*	(.07)	1.16
BOIN1Z	.12*	(.06)	1.16	.12	(.07)	1.13	.17*	(.07)	1.19	.17*	(.07)	1.19
POLEM1Z	.03	(.06)	1.03	.03	(.06)	1.03	-.32***	(.07)	.73	-.31***	(.07)	.73
HIFEDGZ	.07	(.07)	1.07	.06	(.09)	1.06	.05	(.09)	1.05	.16	(.12)	1.17
HHASSZ				.03	(.13)	1.03				-.35	(.21)	.70
Gender Gap:												
Mean	-.37**	(.05)	.69	-.41**	(.12)	.66	-.08	(.08)	.92	-.06	(.08)	.94
LIFE2Z	-.11	(.06)	.90	-.08	(.06)	.92	.12	(.09)	1.13	.09	(.09)	1.09
BODHE5Z	.08		1.08	.06	(.04)	1.06	.05		1.05	.09		1.09

		(.05)						(.09)			(.10)	
AFF1Z	-.01	(.06)	.99	-.03	(.06)	.97	-.15	(.08)	.86	-.16	(.09)	.85
BOIN1Z	.11	(.06)	1.12	.15*	(.06)	1.16	.02	(.08)	1.02	-.01	(.08)	.99
POLEM1Z	.12*	(.06)	1.15	.14*	(.06)	1.15	.01	(.08)	1.01	.02	(.09)	1.02
HIFEDGZ	.17*	(.07)	1.19	.03	(.09)	1.13	.30*	(.11)	1.35	.37**	(.14)	1.45
HHASSZ				.33***	(.12)	1.39				-0.34	(.25)	.71
For Thresholds:												
δ_2	1.64**	(.03)		1.64**	(.03)		2.02**	(.05)		2.03**	(.05)	
δ_3	3.86**	(.05)		3.86**	(.05)		4.22**	(.08)		4.23**	(.09)	

Table 4.11 (cont.)

Random effects (Variance Components)

	Rural								*Urban*							
	Model A				Model B				Model A				Model B			
	Var	*Df*	χ^2	τ	*Var.*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ
Average arithmetic proficiency	.54***	267	1401.40	.72	.55***	266	1400.95	.75	.52***	201	628.29	.64	.52***	200	616.55	.63
Gender gap	.07	267	295.12	.10	.06	266	287.09	.09	.08	201	230.88	.07	.29	200	288.36	.08

τ = Reliability of district-level random effects. * $p < .05$. ** $p < .01$. *** $p < .001$

The intercept γ_{00} = - 1.12, (p < .001) and the corresponding odds for a child in the urban district exp. (-1.12) were .30. Similar to rural districts children in urban districts were (70%) less likely to score at higher levels of arithmetic proficiency compared to scoring at lower levels of proficiency.

Again, contrary to expectations, the estimated odds and thus, the predicted probability of higher levels of arithmetic proficiency, tended to decrease for those children who reside in urban districts characterized by high bodily health and political empowerment. That is, children in districts with high bodily health were an 17% less likely to score at a higher proficiency level keeping all other contextual capabilities constant, and in districts characterized with high political empowerment they were an additional 27% less likely to score at a higher proficiency level. But children living in districts with high affiliation and high bodily integrity were respectively 16% and 17% more likely to score at a higher arithmetic proficiency than children living in districts with low affiliation and low bodily integrity.

None of the district capabilities had an association with the gender gap for arithmetic proficiency in urban districts, with the exception of adult female education. In both Models A and B, the average level of female education emerged as significant and positive predictor that contributed to reducing the gender gap between boys and girls in the urban context. Girls who resided in districts with higher levels of adult female education were 45% more likely to score at higher levels of arithmetic proficiency than lower levels.

Fully conditional model – writing proficiency.

I present the results of the analyses investigating the relationship between child-level variables and the likelihood of high proficiency in writing in Table 4.12. Because

writing proficiency is a binary variable, coefficients indicate the likelihood of a child being proficient or not – that is, being able to write his or her name and a simple sentence with two or fewer mistakes. As with the other proficiencies, I present the results for the rural model first followed by the results for the urban model.

Rural districts. According to the results in Table 4.12 for both Model A and Model B, the estimated odds of children's writing proficiency were 2.44. In contrast to both reading and arithmetic proficiency, children in rural districts were more likely to score at a higher level of proficiency than not. On an average, children were 144% more likely in rural districts to be able to complete successfully the writing assessment.

In Model B, the coefficients of the relevant contextual capabilities were only slightly different from Model A, so I discuss the coefficients of Model B. Results show that the average estimated odds tended to increase for children living in districts characterized by higher affiliation, higher bodily integrity and higher adult female education.

The strongest contextual capability predictor of improved odds of writing proficiency in the rural setting was bodily integrity, followed by highest level of female education, and finally, affiliation. Children were 25% more likely to be proficient in writing than not if they resided in districts with high bodily integrity.

They were 22% more likely to be proficient in writing than not if they resided in districts with a greater proportion of at least one woman in the household having greater than primary education and children were 15% more likely to be proficient in writing than not if they resided in districts with greater affiliations.

Table 4.12 Between-District Hierarchical Linear Model Estimating Capabilities for Writing in Rural and Urban Districts

Random Effect	*Rural*						*Urban*					
	Model A Gamma coefficient (SE)		Odds ratio	Model B Gamma coefficient (SE)		Odds ratio	Model A Gamma coefficient (SE)		Odds ratio	Model B Gamma coefficient (SE)		Odds ratio
Writing Proficiency:												
Intercept	.89***	(.05)	2.44	.89***	(.05)	2.44	1.72***	(.09)	5.58	1.73***	(.09)	5.64
LIFE2Z	.13	(.07)	1.14	.09	(.07)	1.09	.06	(.09)	1.06	.02	(.09)	1.02
BODHE5Z	-.05	(.06)	.97	-.02	(.05)	.98	-.25*	(.10)	.78	-.20	(.11)	.82
AFF1Z	.14***	(.06)	1.15	.16*	(.06)	1.17	.10	(.09)	1.10	.10	(.10)	1.11
BOIN1Z	.22**	(.07)	1.25	.20**	(.07)	1.22	.05	(.09)	1.05	.02	(.09)	1.02
POLEM1Z	.02	(.06)	1.02	.01	(.06)	1.01	-.09	(.09)	.91	-.08	(.09)	.92
HIFEDG	.20***	(.09)	1.22	.36***	(.10)	1.43	.27*	(.13)	1.31	.44**	(.16)	1.55
HHASSZ				-.38**	(.14)	.68				-.50	(.27)	.61

Table 4.12 (cont.)

Random effects (Variance Components)

	Rural								*Urban*							
	Model A				Model B				Model A				Model B			
	Var	*Df*	χ^2	τ	*Var.*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ	*Var*	*Df*	χ^2	τ
Average writing proficiency	.55***	276	964.81	.63	.53***	275	931.39	.62	.70***	210	497.21	.50	.69***	209	489.35	.50
Gender gap	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

τ = Reliability of district-level random effects. * $p < .05$. ** $p < .01$. *** $p < .001$.

There was no statistical evidence of a gender gap for writing proficiency in rural districts. That is, girls had similar levels of proficiency levels in writing as boys and therefore, the gender gap slope was not modeled.

Urban districts. Table 4.11 also presents results for writing proficiency in urban districts. The intercept γ_{00} = 1.73, (p < .001) and the corresponding odds for a child in the urban district exp. (1.73) were 5.64. Thus for both rural and urban districts, on an average, children were more likely be proficient in writing than not. Both bodily health and adult female education were associated with writing proficiency in Model A; however, only the coefficient for adult female education remained statistically significant after include household assets in Model B. In Model B, children were 55% more likely to successfully complete the task on writing proficiency if they lived in a district with a higher average of adult females with more than a primary education.

As with rural districts, there was no gender gap in writing proficiency in urban districts. Thus, this slope was not modeled and girls were as likely as boys to score at higher levels of writing proficiency in urban districts.

Summary.

To reiterate, the primary focus of this study is whether there is a gender gap in education functionings, as measured by proficiencies in reading, arithmetic, and writing, and whether variations in the gap across districts might be explained by differences in the contextual capabilities associated with the districts where children live. In this final set of analyses I examined the relationship of contextual capabilities to the gender gap for specific functionings, as well as examined whether contextual capabilities are associated with the acquisition of these functionings in general. I discuss these results in the same

order as they were presented in the chapter, focusing first on the average log odds for all children and next on the difference in log odds for boy and girls.

The capabilities had modest associations with the likelihood of being proficient in reading, arithmetic, and writing, and, in several models, the direction of the relationship was unanticipated. Although I hypothesized that all of the capabilities would be positively associated with the functionings, bodily health and political empowerment were negatively associated with reading proficiency and arithmetic proficiency, but only in urban settings. Average household assets also had a surprising negative association with writing proficiency in both rural and urban districts. In other words, districts with higher levels of these contextual capabilities tended to have children living in them with lower levels of specific proficiencies.

The other capabilities, however, evidenced associations in the predicted direction. Bodily integrity had the most consistent positive association with the functionings: it was positively associated with reading proficiency in urban areas, arithmetic proficiency in rural and urban areas and writing proficiencies in rural areas. Affiliation was positively associated with arithmetic proficiency in urban areas and writing proficiency in rural areas. Adult female education was positively associated with writing proficiency in both rural and urban districts.

The capabilities included in the models for the gender gap also had modest associations, but, in these models, statistically significant assertions were in the direction that I hypothesized. Bodily integrity, political empowerment, and adult female education all reduced the gender gap in functionings. Girls who lived in rural districts with higher levels of these capabilities had proficiencies in reading and arithmetic more similar to

boys than girls who lived in rural districts with lower levels of these capabilities. However, only adult female education had an association with the gender gap in arithmetic in urban settings. In urban districts with higher levels of this capability, girls performed more similarly to boys on the arithmetic assessment.

Conclusions

The results of the analyses suggest that important and significant distinctions exist between urban and rural contexts of India, especially in terms of how capabilities are associated with children's reading, arithmetic, and writing proficiencies, but also in terms of how they modify gender differences in the three education functionings.

Specifically, first and foremost, the study's models provide some support for my foundational hypothesis that the context of capabilities is important in determining the education functionings of children. That said, the relationship of capabilities and education functionings of children as measured by children's proficiency levels of reading, arithmetic, and writing seems to be a complex one. As such, the influence of capabilities on these functionings, particularly in different rural and urban context, is not straightforward.

The results from the fully unconditional models indicated statistically significant variations between districts for each education functioning outcome variable. These findings provided sufficient justification to explore both child-level and district-level effects for reading, arithmetic, and writing proficiencies. The results from the random-coefficients models also indicated that after controlling for children's demographics, specific school experiences, and household characteristics significant gender differences

existed in reading (rural districts) and arithmetic proficiencies (rural and urban districts) but not writing proficiency.

Child-level characteristics were associated with proficiency levels in anticipated ways. In rural and urban districts, older children and children from the Brahmin caste were more likely to be proficient in reading and arithmetic. Children from Hindu families also consistently outperformed children from Muslim families in all settings. Children from smaller families, families with more educated adult females and more household assets all had higher levels of functioning as well. Some educational experiences varied by rural and urban context, but whether a child reported liking school was the strongest predictor of proficiency in all models.

District-level capabilities were associated with proficiency levels, too, but sometimes in unanticipated ways. Bodily health and political empowerment had negative relationships with average levels of reading and arithmetic proficiency in rural and urban districts; household assets had a negative relationship with writing proficiency in both rural and urban districts. Bodily integrity had the most consistent positive relationship with overall level of proficiencies followed by adult female education.

Three of the contextual capabilities also had positive associations with the gender gap – that is, girls living in districts with higher levels of these capabilities were more likely to have proficiencies comparable to boys. Bodily integrity, political empowerment and adult female education reduced the gender gap in reading and arithmetic proficiency in rural districts; adult female education also reduced the gender gap in arithmetic proficiency in urban districts.

The next chapter will discuss the study's major findings in greater detail, as they relate to each of the three research questions, and evaluate if and how the findings align with the study's hypotheses. Chapter 5 will also provide an assessment of how the study's findings can contribute to future scholarship in light of the study's limitations.

CHAPTER 5: DISCUSSION

Do capabilities or effective opportunities influence gender differences in education functionings? And if yes, how? These overarching questions have guided the analyses in this dissertation. The multilevel analyses on the three education functionings of reading, arithmetic, and writing proficiency present a possible way of measuring the influence of capabilities or effective opportunities and explore ways in which various district-level capabilities act as opportunities and shape children's and girls' chances to achieve education functionings. Although effect sizes are small, I find some evidence that capabilities, as operationalized in this study, are related to education functionings.

In this chapter, I discuss and interpret the study's major findings from Chapter 4 as they relate to each of the three research questions and the hypotheses. This chapter also discusses to what extent the results align with the extant literature, and how the findings potentially inform both policy and practice of girls' education in a developing context. Finally, the chapter provides an assessment of how the study's findings can contribute to future scholarship and policy, while acknowledging the study's limitations. Unless otherwise stated, findings discussed pertain to those from the study's final models.

Review of the Problem

In 2006, India accounted for 23% of the world's out-of-school children, a disproportionate number of whom were girls (UNESCO, 2011). Even as huge strides have been made in girls' education toward achieving gender equity in education, many children remain out of school and for those enrolled, questions persist about what children are actually learning (UNESCO, 2012). Many reports have documented the low learning and achievement levels of children, specifically girls in India, in comparison

with international averages (e.g. ASER, 2010; IEG, 2006; Kingdon, 2002; Pritchett, 2013; Pritchett, Banerji & Kenny, 2013). Given that only slightly more than a quarter of Indian children who complete primary school can read a simple passage, perform division, tell time, and handle money, even though these skills should have been mastered in the earlier years of primary schooling (Pritchett, 2013), it is clear that much work needs to be done to examine the reasons for children's, particularly girls' poor education functionings.

Decades of research have shown the benefits of girls' education on the societies in which they live. Girls' education plays a direct role in poverty reduction, and in inter-generational benefits such as improvement in health, education, and lifestyle outcomes for their children (e.g. Kaushal, 2014; Lee, 2002). However, more importantly, education is beneficial to the girls' themselves. It is the essence of personhood and is a necessary pursuit for all humans broadly considered (Carr, 2003). Despite these benefits, gender equity in education, especially in terms of learning, which I consider as education functioning, has not yet been achieved.

This study focused on the role of effective opportunities – or in terms of the Capability Approach, capabilities – in increasing the likelihood of achieved functioning in education. That is, this study examined capabilities at the district levels and how these capabilities or effective opportunities were related to achievement of education-related functionings of reading, arithmetic, and writing proficiencies, particularly with respect to differences between girls and boys at the primary-age level.

This quantitative study utilized a multilevel model design using data from the India Human Development Study (Desai et al., 2007). The IHDS survey was designed to

measure a range of development-related topics including economic status, employment, health, and education. The interviews also included unique socially relevant topics such as marriage, fertility, social/political participation, gender relations as well as beliefs about education and an assessment of children's proficiencies in reading, arithmetic, and writing (Desai et al., 2007).

I cleaned the survey data, eliminating cases of children who were either above or below the age range 8-11 years old, and for whom a valid dependent variable was unavailable. The final sample for the study was comprised of 11,345 children from 500 districts, though I used the full dataset to estimate the characteristics of the districts in which children resided.

The study's capability variables included six contextual capabilities and drew from Nussbaum's (2000) work on capabilities. These contextual capabilities were constructed at the district-level by using data from all of the households in the dataset, approximately, 40,000 households in India. The contextual capabilities were standardized to aid in interpretation.

This study utilized variations of a general two-level model to explore the three research questions, specifically to examine the extent to which child-level conversion factors (such as demographics, household characteristics, and school experience) and district-level contextual capabilities (that is, measures of average life, bodily health, bodily integrity, education, affiliation, and political empowerment) influence children's education functionings (reading, arithmetic, and writing proficiencies). These models account for the nested nature of the data, namely, children nested within districts.

Multilevel modeling in this study allowed me to operationalize capabilities in a novel way, such that it is empirically distinguishes between capabilities (which are effective opportunities) and functionings (which are achieved valued states of "being" for individuals). As district-level characteristics, the capability variables are emergent characteristics. That is, these capabilities are related to the individuals from whose behaviors they are created but are not reducible to the individual characteristics that helped constitute them. Thus, as conceptualized in this study, they measure effective opportunities for children who live within the districts.

Findings and Interpretation

The study addressed three main research questions. I discuss the findings and my interpretation of the findings for each research question next.

Research Question 1.

The first research questions asked, "To what extent are there gender differences between children in their education functionings as measured by reading, arithmetic, and writing proficiency levels?" With this question I sought to identify whether there were gender differences in education functionings – specifically, whether there were differences in reading, arithmetic, and writing proficiency levels for boys and girls after controlling for individual capabilities and other demographic factors. The answer to this question involved preliminary analyses of relevant data and the estimation of a Level-1 model.

While recent country reports (e.g. NAS-III) have documented a reduction in gender gaps in education, based on extant literature that emphasizes girls' relatively poorer learning levels in different developing contexts, especially India, I hypothesized that there would be gender differences in education functionings. Specifically, I expected

that girls would generally have lower levels of proficiency in all three functionings of reading, arithmetic, and writing proficiency. I also expected gender differences in both the rural and the urban contexts.

Summary of findings. Preliminary analysis showed significant differences between girls and boys on all three education functionings (reading, arithmetic, and writing proficiency), albeit these differences were relatively smaller than what I had expected based on extant literature. Girls were under-represented in the higher levels of proficiency for reading as well as arithmetic. At the same time, they were over-represented in the lower levels of proficiency for both reading and arithmetic. Similarly, in this study, significantly fewer girls than boys were likely to complete the writing task successfully.

These findings on the gender gap were further refined in the level one HLM models or the within-district models for the study. Recall, the level one models included the primary variable of gender and other child-level conversion factors to examine the relationship between child-level characteristics and the three education functionings. Within districts, I found that on average girls were less likely than boys to score at higher levels of proficiency. In rural districts, the gender gap was evidenced in reading, arithmetic as well as writing. In rural districts, the gap was the largest for proficiency in arithmetic and about the same magnitude for proficiencies in reading and writing. However, there was no gender gap on any of the three education functionings within the urban districts in this study. Girls performed at roughly the same level as boys.

The demographic variables, household characteristics, and children's school experiences all had expected results for the within models. Predictably children's age,

grade, if they had never repeated a grade, if they enjoyed school, and Hindu background were consistently and positively associated with a higher likelihood of proficiency in all of the models in both rural and urban districts. The castes of SC and ST were consistently and negatively associated with proficiency in reading, arithmetic, and writing proficiency in both rural and urban settings. Household characteristic of family with four or more children was negatively associated with proficiency in all of the models.

Children who came from households where at least one adult female had attained some primary education did better than children who came from households with no schooling, and children from households with at least one adult woman who had education beyond the primary level did better than children who came from households with adult women with less education. Finally, children who came from households with more assets were more likely to be in higher levels of proficiency for reading, arithmetic, and writing in both rural and urban settings.

Positive education experiences were also associated with proficiency levels, though somewhat differently in rural and urban settings. Whether a child was enrolled in a school was related to proficiency levels only in urban areas, and whether a teacher was typically present was associated positively with proficiency levels only in rural areas, with the exception of reading proficiency, where teacher's presence, was also positively associated with the outcome. Children in higher grades out performed children in lower grades, as did children who had never repeated a grade. Whether a student enjoyed school was positively related to proficiency levels, and it was also the strongest predictor of proficiency levels in rural and urban settings.

Alignment with hypothesis and discussion. First, as stated before, consistent with the hypothesis, there were significant differences between girls and boys in all three functionings of reading, arithmetic, and writing proficiency. On average, girls were less likely to be in the higher levels of reading and arithmetic proficiency, and were less likely to be able to successfully complete the writing task. Concomitantly, they were more likely to be in the lower levels of reading and arithmetic proficiency, and were more likely to be unsuccessful in the writing task. This finding highlights the persistence of a gender gap in education functionings related to learning levels.

At the same time, it is heartening to note that contrary to the gender differences documented in a majority of literature, the gender gaps in this study were relatively small and restricted to children living in rural areas. The study's findings on the relatively small gender difference suggest that although there may still exist disturbingly large gender gaps in terms of other educational outcomes, such as transition to secondary school, that once enrolled girls are learning, albeit at the lower proficiency levels.

Recent reports from the Ministry of Human Resource Development in India support this finding from the study. The NAS –III and V reports highlight the consistently closing gender gap in terms of both enrollment data as well as learning levels, over the three waves of data collection by the ministry between the years 2001 and 2013.

Research Question 2.

The second research question asked, "Does the relationship between gender and education functionings as measured by reading, arithmetic, and writing proficiency levels vary across districts?" The second research question was an extension of the first model,

in which I sought to determine whether any gender differences vary as a function of the districts in which girls and boys live. My primary interest was to determine whether the estimates of gender differences in proficiency are larger in some districts than others; thus, justifying an exploration of whether contextual capabilities might help to explain individual functionings.

Already expecting differences between the rural and the urban settings based on the literature (Hnatkovska & Lahiri, 2013; Vaidyanathan, Nair, & Gopinathan, 2001), I ran the analyses separately for each of the educational functionings of reading, arithmetic, and writing proficiency. As such, based on research that points to regional differences in education in India and other developing contexts (e.g. Bandyopadhyay & Subrahmanian, 2008; Borooah & Iyer, 2002; Husain, 2010; Ward, 2007), I expected gender differences in education functionings to vary across both rural and urban districts in the sample.

Summary of findings. The Intraclass Correlation Coefficients (ICCs) from the fully unconditional models (for reading, arithmetic, and writing proficiency indicated that the variance in children's proficiency level was attributed to factors beyond the child level. The ICCs for reading, arithmetic, and writing proficiency indicated that 12% – 19% of the variance between children on education functionings was attributable to district-level variables. As such, this finding provided some initial support that characteristics of the district may explain a proportion of children's differences on levels of reading, arithmetic, and writing proficiency and that the relationship between gender and education functionings might also vary across districts.

A priori, I expected differences between rural and urban settings and so conducted analyses separately for the two contexts. Although, the study did not directly and

statistically evaluate the differences between rural and urban settings, results showed different coefficients for the two contexts with gender gap coefficients being larger in rural areas but no gender gap in any of the three education functionings in urban areas.

Further, results from the level one models showed that the gender gap did vary across rural districts for reading and arithmetic, and, even though the estimate for the average gender gap in reading was not statistically significant in urban districts, the gap did vary across districts, meaning that it might be statistically significant in some urban district but not others. However, regardless of whether children lived in rural or urban districts, there was no variation in writing proficiency for children living in different districts. As a result I specified models to examine variation in reading proficiency in rural areas and arithmetic proficiency in rural and urban areas.

Alignment with hypothesis and discussion. The study's findings demonstrate that the difference in gender gap coefficients between the rural and urban districts are aligned with the study's hypothesis which expected the gender gap to vary across districts. Research on rural India has emphasized that differences are intensified in rural areas (e.g. Kingdon, 2007; UNESCO, 2011b). Nonetheless, while the results for reading and arithmetic proficiencies in rural districts, and arithmetic proficiency in urban districts support the hypotheses, the results for the reading proficiency and writing proficiency in urban districts did not support the second hypothesis.

Although I did not expect girls and boys to have similar proficiency levels in reading, arithmetic, and writing in urban districts, it is heartening to note this development. That there are no discernible gender differences in urban districts is supported by recent national-level reports on the status of education. The NAS (2010,

2011) reports show the lack of gender gap in education functionings related to learning, especially in urban areas.

Research Question 3.

The final research question asked, "Can gender differences in education functionings as measured by reading, arithmetic, and writing proficiency levels be explained by variation in capabilities across districts?" The main focus of the current study, the third research question, estimated districts' context effects through a Level 2 model. At this level, the education functionings (reading, arithmetic, and writing proficiency), adjusted for children's characteristics included in the Level 1 model, were explored as a function of districts' contextual capabilities. Although my primary interest was to determine whether district level structures of capability influenced the magnitude of gender differences in proficiency levels within districts (the degree of inequality), I also examined whether district level structures of capability influenced average proficiency levels for all children, regardless of gender.

I hypothesized that gender differences within districts are influenced by contextual capabilities associated with the average characteristics of districts. Specifically, I expected the gender gap on reading and arithmetic in rural districts and the variance in gender gap for arithmetic in urban districts, to be lessened or explained away by the contextual capabilities measured at the district level. I also anticipated, though I did not specify a hypothesis regarding the average levels of proficiency in a district, that the contextual capabilities would have a positive association with the functionings of children in general.

Summary of findings. The results were mixed. I found that within rural districts, for both proficiency in reading and arithmetic where I had found a gender gap, two

contextual capabilities emerged as consistent moderators (in both submodel A and final model B) of the gender gap. Specifically, the contextual capabilities of bodily integrity and political empowerment reduced the gap in proficiency between boys and girls. Average number of household assets was the strongest predictor of reducing the gender gap for both reading and arithmetic. None of the other capabilities influenced the variation between districts in the gender gap.

Although not a focus of this study, I also examined whether contextual capabilities influence average proficiency levels children regardless of gender. In the rural districts, no contextual capabilities were related to reading. However, I found the contextual capabilities of bodily integrity to be associated with all three proficiencies and affiliation to be related to proficiency levels of children in writing. Interestingly, the contextual control of district average of household assets was significantly negatively related to proficiency in writing but not proficiency in reading or arithmetic. In the urban districts, affiliation and bodily integrity were associated with average arithmetic proficiency. No other contextual capability was associated positively with individual functionings in urban areas.

There were two anomalous findings in the urban setting. Both bodily health and political empowerment had deleterious effects on the odds of children being in the higher levels of proficiency for both reading and arithmetic. That is, in urban areas that were high in reported bodily health or political empowerment, the odds of children being proficient or in the higher proficiency levels of both reading and arithmetic, were low. There was also an unanticipated negative association between average household assets and writing proficiency in both rural and urban districts. It is possible that areas with

higher levels of bodily health, political empowerment, and average household assets may also be areas with higher levels of inequality or stratification especially in terms of education functionings. These findings suggest that the relationship between district-wide capabilities may not be as straightforward as I anticipated.

Alignment with hypothesis and discussion. Although the results from the models that examined variation in the gender gap tended to confirm my hypotheses, the negative relationship between bodily health and political empowerment were contrary to my hypotheses. In accordance with the capability framework, I expected all capabilities to have a beneficial impact on education functionings. There are several possible explanations for these findings, though none can be considered conclusive.

First, it is possible that the measure of bodily health may not be a particularly good proxy for the underlying concept of capability. There was very little variability in this measure, with most respondents in districts reporting high levels of children's health, and, though not statistically significant, bodily health trended negative in rural as well as urban districts. More fine-grained measures of the opportunity structures associated with bodily health, such as access to medical facilities, clean water, or freedom from exposure to pollutants, may be required to capture the possible influence of this capability on children's education functionings.

The negative relationship between proficiency and political empowerment in urban settings was also unanticipated. However, this relationship may be easier to explain than the negative relationship with bodily health. While political empowerment trended positive in rural settings, it was consistently negative in urban settings and statistically significant for reading and arithmetic proficiencies. Recall that Smith (2008)

documented a more complex association between confidence in political and social institutions and education, with a positive relationship for some institutions and a negative relationship for others. It may be that this complexity also applies to rural and urban households.

Finally, although average household assets was not considered to be a capability in this study, the negative relationship between average household assets and writing proficiency was also unanticipated. For the other proficiencies, the relationship trended positive. However, unlike the other proficiencies, the majority of children in the sample successfully completed the writing task, so those students who could not complete the task were in the minority in most districts. It is possible that in districts with high levels of assets there may also be high levels of educational stratification. Households with children unable to write may be somewhat more clustered in these affluent districts. The finding that not all contextual capabilities had a significant influence on the relationship between gender gap and levels of proficiency in reading, arithmetic, and writing was also an unexpected finding and contrary to my hypotheses. This may be because contextual variables often capture variance from several sources that are not always easily disentangled (Raudenbush & Willms, 1995). Regardless, the findings from this study provide mixed evidence about the influence of what I have referred to as contextual capabilities on individual education functionings. While some variables performed in a manner consistent with my hypotheses, especially concerning the reduction in the gender gap, other variables had no effect or even a counter-intuitive effect.

Primary Findings

In reviewing the results from this study, I identify three primary findings: (a) proficiency levels in India for young children are low to moderate, on average; (b) gender still matters in India; (c) there is substantial evidence that inequalities exist between children and among the rural and urban districts in which they live; and (d) investigating capabilities as a characteristic of communities or geographic contexts is a promising methodological approach but not without complications. I discuss each briefly.

Levels of proficiency.

On average, proficiency levels are generally low to moderate among children in India, with the exception of writing. Nearly half of the children in the sample scored at the low or moderate levels of proficiency in reading and arithmetic, though more than two thirds were proficient in writing. The higher levels of proficiency in writing may be due to the relative simplicity of the assessment task. Nonetheless, few national level surveys, other than the ones spearheaded by National Council of Educational Research and Training (NCERT) (e.g. National Achievement Surveys since 2001) and Pratham (e.g. ASER, 2013) have measured learning levels of children in school, and, consistent with these findings, reports have shown generally low levels of learning for children in India, especially in rural areas.

The low learning levels are a problem for several reasons. First, they highlight a likely area that needs attention in education – that is, the quality of education. These findings provide mixed results about quality. Although whether children enjoy school was consistently and positively associated with education functionings, the presence of a teacher or even being enrolled in school were differentially related to education

functionings in rural and urban settings. Determining what constitutes quality educational opportunities in India in rural and urban settings requires additional research. Second, if relatively low levels of proficiency are evident for many younger children, the magnitude of the problem is likely to increase as children transition to higher levels of education. If children have lower learning levels of achievement in primary school, that is, they lack fundamental skills, children are more likely to repeat grades, lose motivation, and drop out of school in the upper grades. According to Sen (1992), poor levels of functionings can be indicative of disparities in capabilities or effective opportunities of individuals. This study indicates low to modest levels of education functionings for children, especially for girls in rural areas. In keeping with Sen (1992) and Robeyns (2003) this implies disparities in capabilities or effective opportunities for girls that require further investigation.

Gender matters.

Gender matters but only in rural areas. Findings from this study demonstrate that gender is negatively associated with all three education functionings – reading, arithmetic, and writing proficiency. However, after controlling for other characteristics of children, gender matters most in rural areas. Despite the strides in education globally and recent reports documenting gains in gender equity (e.g. NCERT, 2012; ASER, 2013), according to this study, the gender of a child continues to determine her educational functionings in rural areas. Additional research into the reasons for disparities in rural districts would help in understanding why these disparities remain after the initiation of government policies meant to eliminate them.

Inequities persist.

Findings reveal that the usual variables that measure sociocultural stratification in India such as caste, religion, and household assets continue to be associated with children's educational outcomes. This finding highlights two things. First, that children and girls and other groups that are traditionally disadvantaged face multiple marginalization. That is, a girl is less likely to be in higher proficiency levels than boys, but if she is from an SC or ST caste or if she is from a Muslim background, the intersections of her identities may multiply marginalize her and thus, prevent her, from achieving education functioning. Second, findings highlight that capabilities, or effective opportunities, are likely different for the multiply marginalized children and may be possible areas for research as well as policy intervention for the various subgroups.

Aggregate capabilities.

Finally, this study contributes to the burgeoning area of research on applications of the capabilities approach in evaluations of development work broadly, and education specifically (Alkire & Foster, 2011; Anand et al., 2007; Robeyns, 2005). By conceptualizing CA as having potential contextual effects, it suggests a distinct strategy for measuring capabilities and provides preliminary research in the application of capabilities to girls' education in India.

In this study, I conceptualized capabilities as contextual and as emergent characteristics of the districts in which children resided. Because these variables capture properties of an environment or context, they are not reducible to the characteristics of individuals. I mostly used the aggregates of household characteristics to develop the measures of contextual capabilities for each district, a technique used in multilevel modeling to measure the possible contextual effects of individuals living in different

neighborhoods, attending different schools or working in different organizations (Raudenbush & Bryk, 2002). Empirically, aggregates of lower-level characteristics, such as children and households, provide a valid way of distinguishing between capabilities and functionings.

However, as I discovered in this study, the use of aggregate measures to capture the opportunity structures of districts in India is not without challenge. Not all of the measures that I developed to tap the capabilities identified in the literature were associated with education functionings; some measures had counter-intuitive associations with the functionings and no measure was positively associated with all three functionings in rural and urban areas (what I hypothesized would be true). Although I found evidence that aggregated measures of contextual capabilities could help to explain differences in education functioning, particularly for girls and boys in rural settings, much work clearly is required to understand these associations and develop better measures.

This study provides preliminary findings on capabilities and their impact on girls' education specifically, and education of children in India, broadly. While a single narrative does not appear from the findings, capabilities do seem to exert minor influence on education functionings. The findings from this study highlight the possible different sources of influence including community violence, political empowerment, affiliation networks and higher levels of educational attainment among adult females in households others that can impact education functionings of children and girls. From a policy perspective, this study provides evidence of sources of influence, conceptualized as opportunity structures, characteristics not directly related to education, that are worth

pursuing and researching further to be able to address the final barriers to girls' education.

Limitations

Prior to arriving at conclusions or making recommendations about contextual capabilities that may be positively or negatively related to children's and specifically, girls' education functionings in India, it is essential to identify limitations of the study that may affect final interpretations. As with any research study, several limitations exist. This section explores four areas of concern that may impact the study results: (a) the children's sample, (b) difficulties in measuring capabilities, (c) the choice and validity of variables, and (d) exogenous or omitted variables. Each area is discussed briefly below.

First, the sample was limited to children ages 8-11 years who were tested and had complete data on education functionings (i.e. reading, arithmetic, and writing proficiencies). According to Desai et al. (2010), from a total of 17,609 children in the target households, tests were administered to 12,274 children. Untested children were missed because they were either away on vacation, refused to be interviewed, or they could not be found. Thus, the children who were tested do not constitute a random sample of all children, as more children from disadvantaged and poor families were untested compared to children from better-off families (Desai et al., 2010). As a result, these findings may overestimate the education functionings of children in India and underestimate the influence of capabilities, particularly if the capabilities are more strongly associated with lower levels of proficiency.

A second limitation pertains to the subject of examination in this study that is, capabilities. As mentioned before, capabilities or effective opportunities are hard to

define and significantly harder to measure. There is a problem not only in operationalizing their examination but also in determining the "complete" universe of capabilities and their relative significance for functionings and in turn well-being. Although I tried to address some of the definitional difficulties associated with CA by conceptualizing capabilities as a district characteristic, this approach had its own limitations, and, as argued previously, requires additional research.

Another limitation pertains to the variables used in this study – their choice and their validity. The choice of explanatory variables is partly guided by the capability framework and the context of girls' education in India. At the same time, the choice of variables also reflects the challenges associated with secondary data analysis and the absence of statistical databases designed specifically to evaluate a capabilities approach. Moreover, the proxies used to tap some constructs, such as "Teacher present" for educational experiences and "Bodily health" for a capability, had very little variation. These variables may not have provided valid measures of the constructs that they were meant to tap. Future studies could focus on creating and using more gender-referenced capabilities as they may provide better estimates of opportunity structures related to girls' education functionings.

Finally, although this study incorporates several child- and district-level control variables, other critical correlates of children's education functioning that are not included in the analyses or observable by the IHDS study (e.g., specific classroom-related variables, educational quality, viable alternative variables to measure the same underlying construct) could alter the relationships identified in this study. Important exogenous or omitted variables may compromise the integrity of these findings.

CONCLUSION

Despite the limitations, this study contributes much to the literature. This dissertation highlights what Subrahmanian (2005) has previously argued, that when we are looking at gender equity in access to education, in the provision of education, and in the outcomes of education, we need to adopt a notion of substantive equality to recognize that boys and girls start from different places. By examining capabilities as district characteristics or contextual factors, the study provides a measurement strategy and preliminary insights into these "places" – that is, the opportunity structures in which boys and girls reside in India. This study contributes a way to measure capabilities as contextual variables in multilevel models that are successfully able to distinguish capabilities from functionings.

The results of this study offer mild support for how effective opportunities or capabilities influence children's education functionings in terms of reading, arithmetic, and writing proficiencies. A single narrative does not emerge from these analyses, but the analyses indicate that different processes are likely occurring for differing populations of children in different districts with different capability contexts. Results question whether the relationship between capabilities and functionings should be seen as uniformly linear and positive or whether the relationship should be seen as moderated by local conditions.

Current scholarship tends to consider all capabilities as having a positive relationship with different functionings. When extended to this study, I hypothesized that the capabilities studied in this dissertation would have a positive and statistically significant relationship with children's education functionings of reading, arithmetic, and writing proficiency. This study suggests that this assumption may be questionable,

though measurement error may in part explain these findings. Nonetheless, capabilities may operate in different ways and be more important for some functionings than others – in this case, education functionings. A more nuanced theory of the relationship between capabilities and individual functions may be required.

In this study, I have primarily used capabilities as a means. However, according to the CA framework, capabilities can be both means and ends. In fact, the objective of all human endeavor ought to be encouraging the development of capabilities or capabilities as ends. In education for instance, it is not just important for humans to learn their ABC's or gain critical thinking skills or higher order thinking but also for education to improve the set of capabilities – that is, for adults to be able to *be and do* the things they value. Future research could focus on how capabilities in turn promote other capabilities or how education functionings promote other capabilities.

Lastly, although this is an exploratory study, findings from the study indicate that at the policy level, attending to normative or societal opportunity structures and not just economic assets or resources may enhance the opportunities for girls and women to achieve educational functionings.

REFERENCES

Adams, D. (1971). *Education in national development*. New York, NY: McKay.

Alexander, J. A. (2008). *Capabilities and social justice: The political philosophy of Amartya Sen and Martha Nussbaum.* Burlington, VT: Ashgate Publishing Company.

Alkire, S. (2002a). Dimensions of human development. *World Development, 30,* 119-205.

Alkire, S. (2002b). *Valuing freedoms: Sen's capability approach and poverty reduction.* Oxford: Oxford University Press.

Alkire, S., & Black, R. (1997). A practical reasoning theory of development ethics: Furthering the capabilities approach. *Journal of International Development, 9*(2), 263-279.

Alkire, S., & Foster, J. (2011). Understandings and misunderstandings of multidimensional poverty measurement. *The Journal of Economic Inequality, 9*(2), 289-314.

Alkire, S., & Qizilbash, M. (2008). Introduction. In F. Comim, M. Qizilbash, & S. Alkire (Eds.), *The capability approach: Concepts, measures and applications* (pp. 1-25). New York, NY: Cambridge University Press.

Allison, P. D. (2002). *Missing data*. Thousand Oaks, CA: Sage.

Almond, G., & Verba, S. (1963). The civic culture: Political attitudes and democracy in five nations. Princeton, NJ: Princeton University Press.

Anand, P., Hunter, G., Carter, I., Dowding, K., Guala, F., Hees, van M. (2009). The development of capability indicators. *Journal of Human Development and Capabilities, 10*(1), 125-152.

Anand, P., Hunter, G., & Smith, R. (2005). Capabilities and well-being: Evidence based on the Sen-Nussbaum approach to welfare. *Social Indicators Research, 74*,(1), 9-55.

Anand, P., Santos, C., & Smith, R. (2007). The measurement of capabilities. *Open Discussion Papers in Economics, 67*. The Open University, Faculty of Social Sciences, Department of Economics.

Arends-Kuenning, M., & Amin, S. (2001). Women's capabilities and the right to education in Bangladesh. *International Journal of Politics,Culture and Society, 15*(1), 125-142.

Arokiasamy, P., & Goli, S. (2012). Skewed child sex ratio in rural India. *Economic and Political Weekly, 47*(42), 85-94.

ASER Centre. (2011). *Annual status of education report (rural) 2010*. New Delhi, India. Retrieved from http://www.asercentre.org/Annual/Status/of/Education/Report/The/Annual/p/80.html.

ASER Centre. (2014). *Annual status of education report (rural) 201*. New Dehli, India. Retrieved from http://www.asercentre.org/Keywords/p/205.html.

Bandarage, A. (1984). Women in development: Liberalism, marxism, and marxist-feminism. *Development and Change, 15*(4), 495-515.

Bandyopadhyay, M. & Subrahmanian, R., Consortium for Research on Educational Access, Transitions & Equity, & National University of Educational Planning and Administration (India). (2008). *Gender equity in education: A review of trends and factors*. Brighton: CREATE, University of Sussex.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy, 70*(5), 9-49.

Becker, G. S., & University of Michigan (1967). *Human capital and the personal distribution of income: An analytical approach*. Ann Arbor, MI: Institute of Public Administration.

Becker, G. S. (1975). *Human capital: A theoretical and empirical analysis with special reference to education* (2nd ed.), New York, NY: National Bureau of Economic Research.

Behrman, J., Foster, A. D., Rosenzweig, M. R., & Vashishtha, P. (1999). Women's schooling, home teaching, and economic growth. *Journal of Political Economy, 107*(4), 682-719.

Beneria, L., & Sen, G. (1981). Accumulation, reproduction, and women's role in economic development: Boserup revisited. *Signs: Journal of Women in Culture and Society, 7*(2), 279-298

Beneria, L., & Sen, G. (1982) Class and gender inequalities and women's role in economic development: Theoretical and practical implications. *Feminist Studies*, *8*(1), 157-176.

Benhabib, J., & Spiegel, M. M. (1994). The role of human capital in economic development. *Journal of Monetary Economics*, *34*(2), 143-173.

Bhalla, A. S. (1995). *Uneven development in the third world: A study of China and India* (2nd ed.). New York, NY: St. Martin's Press.

Bofota, Y. B. (2013). The impact of social capital on children's educational outcomes: The case of Tanzania. *Discussion Paper 2013-3*. Institut de Recherches Economiques et Sociales de l'Universite Catholique de Louvain.

Bonvin J-M., & Farvaque, N. (2006). Promoting capability for work: The role of local actors. In S. Deneulin, M. Nebel, & N. Sagovsky (Eds.), *Transforming unjust structures: The capability approach* (pp. 121-142). Netherlands: Springer.

Borooah, V. K., & Iyer, S. (2005, January 29). Religion, literacy, and the female-to-male ratio. *Economic and Political Weekly, 40*(5), 419-427.

Boserup, E. (1970). *Woman's role in economic development*. London: Allen & Unwin.

Bowles, S. & Gintis, H. (1975). The problem with human capital theory: A Marxian critique. *The American Economic Review, 65*(2), 74-82.

Brighouse, H., & Unterhalter, E. (2010). Education for primary goods or for capabilities?. In H. Brighouse & I. Robeyns (Eds.). *Measuring justice: Primary goods and capabilities*. Cambridge: Cambridge University Press.

Cahill, M. B. (2005). Is the human development index redundant? *Eastern Economic Journal, 31*(1), 1-5.

Carnoy, M. (1974). *Education as cultural imperialism.* New York, NY: McKay.

Carr, D. (2003). *Making sense of education: An introduction to the philosophy and theory of education and teaching.* London, UK: RoutledgeFalmer.

Chiappero-Martinetti, E. (2005). Complexity and vagueness in the capability approach: Strengths or weaknesses? In F. Comim, & M. Qizilbash (Eds.), *Justice and*

poverty: Essays on operationalizing Amartya Sen's capability approach. Cambridge: Cambridge University Press.

Clark, D. A. (2005). Sen's capability approach and the many spaces of human well-being. *Journal of Development Studies, 41*(8), 1339-1368.

Coburn, D. (2004). Beyond the income inequality hypothesis: Class, neo-liberalism, and health inequalities. *Social Science & Medicine, 58*(1), 41-56.

Colclough, C. (2004). Achieving gender equality in education: What does it take? *Prospects, 34*,(1), 3-10.

Comim, F. (2008). Measuring capabilities. In F. Comim, M. Qizilbash, & S. Alkire (Eds.), *The capability approach: Concepts, measures and applications.* Cambridge: Cambridge University Press.

Commonwealth Secretariat. (1995). *The 1995 Commonwealth plan of action on gender and development: A commonwealth vision*. London: Commonwealth Secretariat Women's and Youth Affairs Division.

Crocker, D. A. (1992). Functioning and capability: The foundations of Sen's and Nussbaum's development ethic. *Political Theory*, *20*(4), 584-612.

Crocker, D. A. (2006). Sen and deliberative democracy. In A. Kaufman (Ed.), *Capabilities equality: Basic issues and problems* (pp. 155-97). New York, NY: Routledge.

Crocker, D. A. (2008). *Ethics of global development: Agency, capability, and deliberative democracy*. Cambridge: Cambridge University Press.

Croninger, R., & Douglas, K. (2005). Missing data and institutional research. *New Directions for Institutional Research, 2005*(127), 33-49.

Cummins, J. (1996). Tax reforms and investment: A cross-country comparison. *Journal of Public Economics, 62*, 237-273.

Dagenais, H., & Piche, D. (1994). Concepts and practices of development: Feminist contributions and future perspectives**.** In H. Dagenais & D. Piché, (Eds.) *Women, feminism and development*. Montreal, Canada: McGill-Queen's University Press.

Das Gupta, M. (1987). Selective discrimination against female children in rural Punjab, India. *Population and Development Review, 13*(1), 77-100.

Das Gupta, M. (1994). Fertility decline and gender differentials in mortality in India. In U. N. Fund & H. P. Yŏn′guwŏn (Eds.), *International symposium on issues related to sex preference for children in the rapidly changing demographic dynamics of Asia.* Seoul, Korea: United Nations Population Fund; Korean Institute of Health and Social Affairs.

Davis-Kean, P. E. (2005).The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology, 19*(2), 294-304.

Deneulin, S. (2008). Beyond individual freedom and agency: Structures of living together in Sen's capability approach to development. In S. Alkire, F. Comim, & M. Qizilbash (Eds.), *The capability approach: Concepts, measures and application* (pp. 105-124). Cambridge: Cambridge University Press.

Deneulin, S., Nebel, M., & Sagovsky, N. (Eds.). (2006). *Transforming unjust structures: The capability approach*. Dordrecht, the Netherlands: Springer.

Deon, F. (2000). The structure of social disparities in education: Gender and wealth. *Policy research working paper no. 2268, World Bank development research*

group/poverty reduction and economic management network. Washington, DC: World Bank.

Desai, S. (1994). *Gender inequalities and demographic behavior: India.* New York, NY: The Population Council.

Desai, S., Dubey, A., Joshi, B. L., Sen, M., Shariff, A., & Vanneman, R. (2007). *India human development survey (IHDS) ICPSR22626-v2* [Data file]. University of Maryland and National Council of Applied Economic Research, New Delhi [producers], 2007. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 30 June 2009.

Desai, S., Dubey, A., Joshi, B., Sen, M., Shariff, A., & Vanneman, R. (2010). *Human development in India: Challenges for a society in transition.* Delhi: Oxford University Press.

Desai, S., Vanneman, R., & National Council of Applied Economic Research (2005). *India human development survey (IHDS).* Ann Arbor, MI: Inter-university Consoritium for Political and Social Research.

Diaw, C. (2002). Gender and education in sub-saharan Africa: The women in development approach (WID) and its discontents. *LLC Review*, 54-66.

Dollar, D., & Gatti, R. (1999, March). Gender inequality, income and growth: Are good times good for women? *World Bank Policy Reseach Report on Gender and Development, Working Paper Series No. 1*. Washington, DC: World Bank.

Doyal , L. & Gough, I. (1991). *A theory of human need.* New York, NY: Palgrave Macmillan.

Drèze, J., & Kingdon, G. G. (2001). School participation in rural India. *Review of Development Economics, 5*(1), 1-24.

Drèze, J. and Sen, A. (1995). *India, economic development and social opportunity.* Delhi: Oxford University Press.

Drèze, J., & Sen, A. (1997). *Indian development: Selected regional perspectives*. Delhi: Oxford University Press.

Drèze, J. & Sen, A. (2002). *India: Development and participation*. Oxford University Press.

Duncan, G. J., & Brooks-Gunn, J. (Eds.). (1997). *Consequences of growing up poor*. New York, NY: Russell Sage Foundation.

Dyson, T., & Moore, M. (1983). On kinship structure, female autonomy, and demographic behavior in India. *Population and Development Review, 9*(1), 35-60.

Elster, J. (1982). Sour grapes: Utilitarianism and the genesis of wants. In A. Sen & B. Williams (Eds.), *Utilitarianism and Beyond*. Cambridge: Cambridge University Press.

Ermisch, J., & Pronzato, C. (2010). *Causal effects of parents' education on children's education*. Colchester: Institute for Social and Economic Research, University of Essex.

Fagerlind, A., & Saha, L. J. (1997). *Education and national developments.* New Delhi: Reed Educational and Professional Publishing Ltd.

Fitzsimons, P. (2000). Neo-liberalism and 'social capital': Reinventing community. Paper presented at the AERA Symposium Neoliberalism, Welfare and Education. New Orleans, LA. Retrieved from http://www.amat.org.nz/Neoliberalism.pdf

Fulu, F., Warner, X., Miedema, S., Jewkes, R., Roselli, T., & Lang, J. (2013). Why do some men use violence against women and how can we prevent it? Quantitative findings from the UN multi-country study on men and violence in Asia and the Pacific. Bangkok: UNDP, UNFPA, UN Women and UNV.

Geertz, C. (1963). The integrative revolution: Primordial sentiments and civil politics in the new states. In C. Geertz (Ed.), *Old societies and new states* (pp. 105-57). New York, NY: The Free Press.

Goetz, A.M. (1997). *Getting institutions right for women in development*. New York, NY: Zed Books.

Gracia, E., & Herrero, J. (2008). Is it considered violence? The acceptability of physical punishment of children in Europe. *Journal of Marriage and Family, 70*(1), 210-217.

Granovetter, M. A. (1974). *Getting a job.* Cambridge, MA: Harvard University Press.

Haines, V. A., Beggs, J. J., & Hurlbert, J. S. (2008). Contextualizing health outcomes: Do effects of network structure differ for women and men? *Sex Roles, 59*(3-4), 164-175.

Hannum, E., & Buchmann, C. (2004). Global educational expansion and socio-economic development: An assessment of findings from the social sciences. *World Development, 33*(3), 1-22.

Harding, D. J. (2009). Collateral consequences of violence in disadvantaged neighborhoods. *Social Forces 88*(2), 757-784. doi 10.1353/sof.0.0281.

Harvey, D. (2003). *The New Imperialism*. New York: Oxford University Press.

Harvey, D. (2005). *A Brief History of Neoliberalism*. New York: Oxford University Press.

Heagerty, P. J., & Zeger, S. L. (2000). Multivariate continuation ratio models: Connections and caveats. *Biometrics, 56*(3), 719-732.

Henrich C. C., Schwab-Stone, M., Fanti, K., Jones, S. M., & Ruchkin, V. (2004) The association of community violence exposure with middle school achievement: A prospective study. *Journal of Applied Developmental Psychology, 25*(3), 327-48.

Hetherington, M. J. (1998). The political relevance of political trust. *The American Political Science Review, 92*(4), 791-808.

Horowitz, B., & Kishwar, M. (1984). Family life–The unequal deal. In M. Kishwar & R. Vanita, (Eds.), *In search of answers: Indian women's voices from Manushi* (pp. 69-103). London: Zed Books.

Husain, Z. (2011). Gender disparities in completing school education in India: Explaining geographical variations. *Journal of Population Research, 28,*(4), 325-352.

Inglehart, R. F. (1990). *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.

Inglehart, R. F. (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton, NJ: Princeton University Press.

Islam, N. (1995). Growth empirics: A panel data approach. *Quarterly Journal of Economics, 110*(4), 1127-1170.

Jayachandran, U. (2002). *Socio-economic determinants of school attendance in India. Working Paper No. 103*. Centre for Development Economics. Retrieved from http://www.esocialsciences.org.

Jejeebhoy, S. J., & Rao, S. R. (1995). Unsafe motherhood: A review of reproductive health. In M.D. Gupta, L. C. Chen, & T. N. Krishnan (Eds.) *Women's health in India: Risk and vulnerability.* Bombay, India: Oxford University Press.

Kalben, B. B. (2002). Mortality Differentials in Specified Age Groups. In Society of Actuaries, *Why men die younger: Causes of mortality differences by sex* (pp. 17-20). Retrieved from https://www.soa.org/news-and-publications/publications/other-publications/monographs/m-li01-1-toc.aspx.

Kane, E. (2004). Education in Africa: What do we know about strategies that work? *Africa Region Human Development Working Paper No. 73*. Washington, D. C.: World Bank.

Kaushal, N. (2014). Intergenerational payoffs of education. *Future of Children, 24,* 1, 61-78.

Kelkar, G. (1992). Violence against women: Perspectives and strategies in India. *Occasional Papers 30*. New Delhi, India: Indian Institute of Advanced Study.

Kerr, J. (2002, October). From "WID" to "GAD" to women's rights: The first twenty years of AWID. *Occasional Paper no. 9*. Retrieved from http://www.awid.org/publications/OccasionalPapers/occasional9.html.

Kingdon, G. G. (2002). The gender gap in educational attainment in India? How much can be explained. *Journal of Development Studies, 39,* (225-53).

Kingdon, G. G. (2007). *The progress of school education in India.* Global Poverty Research Group. Retrieved from http://www.gprg.org/pubs/workingpapers/pdfs/gprg-wps-071.pdf.

Kingdon, G. G., & Theopold, N. (2006). *Do returns to education matter to schooling participation?*. Oxford: Economic and social research council (ESRC).

Kishor, S. (1993). "May God give sons to all": Gender and child mortality in India. *American Sociological Review, 58*(2), 247-265.

Klees, S. J. (2008). A quarter century of neoliberal thinking in education: Misleading analyses and failed policies. *Globalization, Societies, and Education, 6*(4), 311-348.

Kleist, C. (2013). A discourse ethics defense of Nussbaum's capabilities theory. *Journal of Human Development and Capabilities, 24*(2), 266-284.

Kuper, L, & Smith, M. G. (Eds.). (1969). *Pluralism in Africa*. Berkeley, CA: The University of California Press.

Kwapong, O. T. (2005). Using adult education for empowerment of rural women. *Adult Education and Development , 65*, 135-152.

Lavy, V. (1996). School supply constraints and children's educational outcomes in rural Ghana. *Journal of Development Economics, 51*(2), 291-314.

Lee, V.E., & Burkam, D.T. (2003). Dropping out of high school: The role of school organization and structure. *American Educational Research Journal, 2*, 353-393.

Lee, W. O., Asian Development Bank., & Comparative Education Research Centre. (2002). Equity and access to education: Themes, tensions, and policies. *Education in Developing Asia, 4*. Manila, Phillipines: Asian Development Bank.

Levi, M., & Stoker, L. (2000). Political trust and trustworthiness. *Annual Review of Political Science, 3*, 475-507, DOI: 10.1146/annurev.polisci.3.1.475

Lin, N. (1999). Social networks and status attainment. *Annual Review of Sociology, 25*, 467-487.

Lin, N., Woelfel, M. W., & Light, S. C. (1985). The buffering effect of social support subsequent to an important life event. *Journal of Health and Social Behavior, 26*, 247-263.

Lipset, S. M. (1959). Some social requisites of democracy. *American Political Science Review 53*(1), 69-105.

Ma, X., Ma, L., & Bradley, K. D. (2008). Using multilevel modeling to investigate school effects. In A. A. O'Connell & D. B. McCoach (Eds.), *Multilevel modeling of educational data* (pp. 59-110). Charlotte, NC: Information Age.

Mannathoko, C. (2008). Promoting educational quality through gender-friendly schools. In M. Tembon, & L. Fort (Eds.), *Girls' education in the 21st century: Equality, empowerment and growth* (pp. 127-142). Washington DC: World Bank Publications.

Martinetti, E. C. (2006). Capability approach and fuzzy set theory: Description, aggregation and inference issues. In A. Lemmi, & G. Betti (Eds.), *Fuzzy set approach to multidimensional poverty measurement.* New York, NY: Springer.

Mehmed, M. S. (2011, February 25). Q&A: "Education must reach the marginalised" (Interview with Irina Bokova). Retrieved from http://www.ipsnews.net/2011/02/qa-education-must-reach-the-marginalised/.

Mies, M. (1982). *The lace makers of Narsapur: Indian housewives produce for the world market.* London: Zed Books.

Molla, T. (2014). Neo-liberal policy agendas and the problem of inequality in higher education: the Ethiopian case. *Policy Futures in Education, 12*(2), 297-309. Retrieved from http://dx.doi.org/10.2304/pfie.2014.12.2.297

Moore, G. (1990). Structural determinants of men's and women's personal networks. *American Sociological Review*, 726-735.

Moore, H. (1988). *Feminism and Anthropology.* Oxford: Polity Press.

Moser, C. O. (2005). *An introduction to gender audit methodology: Its design and implementation in DFID Malawi.* London: Overseas Development Institute.

Muller, E., & Seligson, M. (1994). Civic culture and democracy: The question of causal relationship. *American Journal of Political Science, 88,* 635-652.

National Council of Education Research and Training. (2002). *Seventh All India School Education Survey*. New Delhi: Department of Educational Surveys and Data Processing.

National Council of Educational Research and Training (2012). *National achievement survey class V (cycle 3).* Retrieved from: http://www.ncert.nic.in/departments/nie/esd/pdf/NAS_5_cycle3.pdf

National Council of Educational Research and Training (2014). *National achievement survey class III (cycle 3).* Retrieved from: http://www.ncert.nic.in/departments/nie/esd/pdf/NAS_5_cycle3.pdf

Nielsen, H. D., & World Bank. (2006). *From schooling access to learning outcomes, an unfinished agenda: An evaluation of World Bank support to primary education*. Washington, DC: World Bank.

Nussbaum, M. C. (1995). Human capabilities, female human beings. In M. C. Nussbaum, & J. Glover (Eds.), *Women, culture, and development: A study of human capabilities* (pp. 61-104). Oxford, UK: Oxford University Press.

Nussbaum, M. C. (2000). *Women and human development.* Cambridge, UK: Cambridge University Press.

Nussbaum, M. C. (2001). *Women and human development: The capabilities approach.* Cambridge, UK: Cambridge University Press.

Nussbaum, M. C. (2003). Capabilities as fundamental entitlement: Sen and social justice. *Feminist Economics, 9*(2-3), 33-59.

Nussbaum, M. C. (2006). Education and democratic citizenship: Capabilities and quality education. *Journal of Human Development, 7*(3), 385-395.

Nussbaum, M. C. (2011). *Creating capabilities: The human development approach*. Cambridge, MA: Belknap Press of Harvard University Press.

O'Connell, A. A., Goldstein, J.,Rogers, H. J., & Peng, C.-Y. J. (2008). Multilevel logistic models for dichotomous and ordinal data. In A. A. O'Connell and B. McCoach (Eds.), *Multilevel analysis of educational data* (pp. 199-242). Charolotte, NC: Information Age Publishing Inc.

Ortega, D., & Pritchett, L. (2014). Much higher schooling, much lower wages: Human capital and economic collapse in Venezuela. In R. Hausmann & F. Rodriguez (Eds.), *Venezuela before Chavez: Anatomy of an economic collapse* (pp. 187-206). University Park: Penn State University Press.

Parpart, J. (2000). Postfeminism. In C. Kramarae, & D. Spender (Eds.), *Routledge international encyclopedia of women: Global women's issues and knowledge* (Vol. 3). New York: Routledge.

Preston, P. (1996). *Development theory: An introduction.* Cambridge, Massachusetts: Blackwell Publishers.

Pritchett, L. (2013). *The rebirth of education: Schooling ain't learning*. Washington, DC: Center for Global Development.

Pritchett, L., Banerji, R., & Kenny, C. (2013). *Schooling is not education! Using assessment to change the politics of non-learning*. Washington, DC: Center for Global Development.

Psacharopoulos, G., & Patrinos, H. A. (2002). Returns to investement in education: a further update. *World Bank Policy Research Working Paper 2881*. Washington D.C.: World Bank.

Psacharopoulos, G., & Woodhall, M. (1997). *Education for development: An analysis of investment choice.* New York: Oxford University Press.

Qadeer, I. & Ramachandran, V. (2007). *Ensuring universal access to health and education in India.* Delhi: Wada Na Todo Abhiyan.

Ramsay, H. (1992). Whose champions? Multinationals, labour and industry policy in the European Community after 1992. *Capital and Class, 48*, 17-39.

Rathgeber, E. M. (1990). WID, WAD, GAD: Trends in research and practice. *The Journal of Developing Areas, 24*(4), 489-502.

Rathgeber, E. M., & Motzafi-Haller, P. (2007). Engendering water in the Middle East: Some preliminary thoughts. In C. Lipchin, E. Pallant, D. Saranga, & A. Amster

(Eds.), *Integrated water resources management and security in the Middle East* (pp. 237-250). Dordrecht: Springer.

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2013). *HLM 7.01 for Windows* [Computer software]. Skokie, IL: Scientific Software International, Inc.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.

Raudenbush, S. W., & Willms, J. D. (1995). The estimation of school effects. *Journal of Educational Statistics, 20*(4), 307-335.

Razavi, S., & Miller, C. (1995, February). From WID to GAD: Conceptual shifts in the women and development discourse. *Occasional Paper 1*. Geneva: United Nations Research Institute for Social Development.

Ridker, R. G. (Ed.) (1997). Determinants of educational achievement and attainment in Africa: Findings from nine cases studies. *SD Publication Series, Technical Paper No. 62*. Washington, DC: U.S. Agency for International Development.

Robeyns, I. (2000). An unworkable idea or a promising alternative? Sen's capability approach re-examined. *Center for Economic Studies Discussion paper 00.30.* Leuven.

Robeyns, I. (2003). Sen's capability approach and gender inequality: Selecting relevant capabilities. *Feminist Economics, 9*, 61-92.

Robeyns, I. (2005, January). The capability approach and welfare policies. *Paper presented at the conference on gender auditing and gender budgeting*. Bologna.

Robeyns, I. (2006). Three models of education: rights, capabilities and human capital. *Theory and Research in Education, 4*(1), 69-84.

Robeyns, I. (2008). Sen's capability approach and feminist concerns. In F. Comim, M. Qizilbash, & S. Alkire (Eds.), *The capability approach: Concepts, measures and applications* (pp. 82-104). New York, USA: Cambridge University Press.

Schultz, T. P. (2002). Why governments should invest more to educate girls. *World Development, 30*(2), 207-225.

Schultz, T. W. (1961). Investment in human capital [presidential address delivered at the annual meeting of the American Economic Association, Saint Louis, MO, December, 1960]. *The American Economic Review, 51*, 1-17.

Schultz, T. W. (1963). *The economic value of education.* New York: Columbia University Press.

Schultz, T. W. (1993). The economic importance of human capital in modernization. *Education Economics, 1*(1), 13.

Schwartz, D., & Gorman, A. H. (2003). Community violence exposure and children's academic functioning. *Journal of Educational Psychology, 95*(1), 163-73.

Sen, A. K. (1980). Equality of what? In S. McMurrin (Ed.), *Tanner Lectures on Human Values.* Salt Lake City: University of Utah Press.

Sen, A. (1984). Resources, values and development. Oxford, UK: Basil Blackwell.

Sen, A. K. (1990, December 20). More than 100 million women are missing. *New York Review of Books*, 61-66.

Sen, A. K. (1992). *Inequality reexamined.* Cambridge, MA: Harvard University Press.

Sen, A. (1993). Capability and well-being. In M. Nussbaum, A. Sen, & World Institute for Development Economics Research (Eds.), *The quality of life* (pp. 30-53). Oxford, UK: Clarendon Press.

Sen, A. K. (1997). Human capital and human capability. *World Development, 25*(12), 1959-1961.

Sen, A. (1997). Maximization and the act of choice. *Econometrica, 65*, 745-779

Sen, A. K. (1999). *Development as freedom.* Oxford: Oxford University Press.

Sen, G., & Östlin, P. (2008). Gender inequity in health: Why it exists and how we can change it. *Global Public Health, (3)*S1, 1-12.

Shakoor, B. H., & Chalmers, D. (1991). Co-victimization of African-American children who witness violence: Effects on cognitive, emotional, and behavioral development, *Journal of the National Medical Association, 83*(3), 233-238.

Smith, T. W. (2008). Trends in Confidence in Institutions, 1973-2006. *GSS Social Change Report No. 54*. Retrieved from http://publicdata.norc.org:41000/gss/documents/SCRT/SC54%20Trends%20in%20Confidence%20in%20Institutions.pdf

Snijders, T. A., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling.* Thousand Oaks, CA: Sage Publications.

Stanton-Salazar, R. D., & Dornbusch, S. M. (1995). Social capital and the reproduction of inequality: Information networks among Mexican-origin high school students. *Sociology of Education, 68*, 116-135.

Stewart, F. (1985). *Planning to meet basic needs.* London: Macmillan.

Stoler, A. (1977). Rice harvesting in Kali Loro: A study of class and labour relations in rural Java. *American Ethnologist, 4*, 678-698.

Strayhorn. T. L. (2008). Influences on labor market outcomes of African American college graduates: A national study. *Journal of Higher Education, 79*(1), 28-57.

Streeten, P., Burki, S. J., ul Haq, M., Hicks, N., & Stewart, F. (1981). *First things first: Meeting basic human needs in developing countries.* New York: Oxford University Press.

Stromquist, N. P. (1990). Gender inequality in education: Accounting for women's subordination. *British Journal of Sociology of Education, 11*(2), 137-153.

Stromquist, N. P. (1998). Agents in women's education: Some trends in the African context. In M. Bloch, J. A. Beoku-Betts, & B. R. Tabachnick (Eds.), *Women's education in sub-saharan Africa: Power, opportunities and constraints* (pp. 25-46). Boulder, CO: Lynne Reinner Publishers.

Subrahmanian, R. (2005). Gender equality in education: Definitions and measurements. *International Journal of Educational Development, 25*(4), 395-407.

Sugden, R. (1993). Welfare, resources and capabilities: A review of inequality rexamined by Amartya Sen. *Journal of Economic Literature, 31*, 1947-1962.

Tan, E. (2014). Human capital theory: A holistic criticism. *Review of Educational Research*, *84*(3), 411-445.

Teschl, M. & Comim, F. (2005). Adaptive preferences and capabilities: Some preliminary conceptual explorations. *Review of Social Economy*, *63*(2), 229-247.

Tinker, I. (1990). The making of a field: Advocates, practitioners, and scholars (pp 27-53). In I. Tinker (Ed.). *Persistent inequalities: Women and world development*. New York: Oxford University Press.

Tipps, D. C. (1973). Modernization theory and the comparative study of Ssocieities: A critical perspective. *Comparative Studies in Society and History*, *15*(2), 199-226.

Tjaden, P., & Nancy Thoennes. (2000). *Full report of the prevalence, incidence, and consequences of violence against women*. Washington, DC: U.S. Department of Justice. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/183781.pdf.

UNESCO (2002). Education for All: Is the world on track?. *Education for All global monitoring report*. Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2002-efa-on-track/.

UNESCO (2005). The quality imperative. *Education for All global monitoring report*. Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2005-quality/.

UNESCO (2006). Literacy for life. *Education for All Global Monitoring Report.* Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2006-literacy/.

UNESCO (2010). Reaching the marginalized. *Education for All global monitoring report.* Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2010-marginalization/.

UNESCO (2011b). The hidden crisis: Armed conflict and education. *Education for All Global Monitoring Report 2011*. Retrieved from http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2011-conflict/.

UNESCO (2012). Youth and skills: Putting education to work. *Education for All Global Monitoring Report 2012*. Retrieved from

http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/efareport/reports/2012-skills/.

UNESCO Institute for Statistics. (2006). *Children out of school: Measuring exclusion from primary education.* Retrieved from http://www.uis.unesco.org/Library/Documents/oosc05-en.pdf

UNESCO Institute for Statistics. (2011). Out-of-school children: New data reveal persistent challenges. *UIS fact sheet no. 12*. Retrieved from http://www.uis.unesco.org/FactSheets/Documents/FS12_2011_OOSC_EN.pdf

UN Works (n.d.). *Geetha: Little hope for the future*. Retrieved June 8, 2011 from http://www.un.org/works/sub3.asp?lang=en&id=85.

Unterhalter, E. (2000) Transnational visions of the 1990s: Contrasting views of women, education and citizenship. In M. Arnot and J. Dillabough (Eds.), *Challenging democracy. International perspectives on gender, education and citizenship* (pp. 87-102). London, UK: Routledge.

Unterhalter, E. (2005). Fragmented frameworks? Researching women, gender, education and development. In S. Aikman & E. Unterhalter (Eds.), *Beyond access: Transforming policy and practice for gender equality in education* (pp. 15-35). Oxford, UK: Oxfam GB.

Unterhalter, E. (2008). Needs, rights and capabilities. In S. Fennell & M. Arnot (Eds.), *Gender education and equality in a global context: Conceptual frameworks and policy perspectives* (pp. 19-34). London: Routledge.

Unterhalter, E. (2008). Global values and gender equality in education: Needs, rights and capabilities. In S. F. Arnot (Ed.), *Gender education and equality in a global*

context: Conceptual frameworks and policy perspectives (pp. 19-34). Oxon, Canada: Routledge.

Unterhalter, E., & Vaughan, R. & Walker, M. (2007). The capability approach and education. *Prospero, 13*(3), 13-21.

Varghese, N. V. (1994). District primary education programme: the logic and the logistics. *Journal of Educational Planning and Administration, 8*(4), 449.

Vivek, G., & Dar, V. (2006). Millennium development goals: A preview of the progress status in India. *Implementation of MDGs in India working paper 02/06*. SIES College of Management Studies.

Walby, S. 2012. Sen and the measurement of justice and capabilities: A problem in theory and practice. *Theory, Culture and Society, 29*(1), 99-118.

Wade, R. H. (2004). Is Globalization Reducing Poverty and Inequality? *World Development, 32*(4), 567-589.

Ward, M. (2007). Rural Education. *India Infrastructure Report 2007.* Retrieved from http://www.iitk.ac.in/3inetwork/html/reports/IIR2007/12-Rural%20Education.pdf.

Wigley, S., & Akkoyunlu-Wigley, A. (2006). Human capabilities versus human capital: Gauging the value of education in developing countries. *Social Indicators Research, 78*(2), 287-304.

Williams, B. (1987). The standard of living: Interests and capabilities. In G. Hawthorn (Ed.), The standard of living. Cambridge, UK: Cambridge University Press.

Young, K. (1992). *Gender and development readings.* Ottawa: Canadian Council for International Cooperation.

Young, K. (2011). Gender and development. In N. Visvanathan, L. Duggan, L. Nisonoff, & N. Wiegersma (Eds.), *The women, gender and development reader* (2nd ed.). London: Zed Books.

Young, K., Wolkowitz, C., & McCullagh, R. (1981). *Of marriage and the market: Women's subordination internationally and its lessons*. London: Routledge & KeganPaul.