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## ABSTRACT

### UNDERSTANDING RACIAL INEQUITIES IN COPRODUCTION: THE CASE OF PUBLIC EDUCATION

By

ESTHER HAN

AUGUST 2023

Committee Chair: Dr. Gregory B. Lewis

Major Department: Public Management and Policy

This dissertation investigates the prevalence and mechanism of racial inequities in coproduction within public education: parent involvement. Also, it evaluates the effectiveness of the government initiatives, managerial approaches to promote coproduction, on alleviating the inequities. Using National Household Education Survey (NHES) 2012-19, the study primarily conducted logit regressions with Jackknife replication method. Results showed that the co-delivery and co-commissioning activities at school offer unequal access to racial minority parents, and the racial disparities were bigger for co-commissioning than co-delivery. Racial gaps in abilities and resources primarily explained the racial disparities in coproduction, yet the contributing factors varied by race. Finally, the government initiatives had different impacts on improving inequities. Providing information on coproduction did not necessarily improve unequal access for racial minority parents. In contrast, providing translated materials and interpreters effectively alleviated the racial inequities in co-commissioning.

The findings contribute to improving our insufficient understanding of identifying and resolving coproduction's negative effects on equity. Moreover, the dissertation provides important guides for studying the issues of (racial) inequities and exclusions in coproduction.

First, more scholarly attention is necessary to the disparities in coproduction, especially in co-commissioning. Second, research should investigate unequal access and inclusions across various coproduction activities by policy cycle and context. Third, a one-size fits all approach would not work for examining and alleviating the racial inequities in coproduction. Lastly, when assessing effectiveness of coproduction and government initiatives, racial equity should be one of the primary outcomes. The empirical evidence also offers some useful policy implications. Practitioners should address unequal access and inclusions separately for different coproduction activities and racial groups. Especially, they should put more effort into recognizing and improving racial gaps in decision-making coproduction activities, co-commissioning at school, so as not to exclude minority students' service needs.

UNDERSTANDING RACIAL INEQUITIES IN COPRODUCTION:  
THE CASE OF PUBLIC EDUCATION  
BY  
ESTHER HAN

A Dissertation Submitted in Partial Fulfillment  
of the Requirements for the Degree  
of  
Doctor of Philosophy  
in the  
Andrew Young School of Policy Studies  
of  
Georgia State University

GEORGIA STATE UNIVERSITY  
2023

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## ACCEPTANCE

This dissertation was prepared under the direction of the candidate's Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Policy in the Andrew Young School of Policy Studies of Georgia State University.

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## **Dedication**

To Anna Han and Bobby Farmer

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## **Chapter I: Introduction**

Citizen-state interactions are the core of public administration (Mary E Guy, 2021), as citizens provide their resources and perspectives that benefit government activities (Jakobsen, James, Moynihan, & Nabatchi, 2019). Coproduction is an especially important element of citizen-state interactions in both policy implementation and public service delivery (Mary E Guy, 2021; Jakobsen et al., 2019) and is prevalent practices in public service provision in multiple policy arena, such as education, health, environment, public safety, and community service.

Although various definitions exist for coproduction, the crux of the concept is clients' (public service user) or citizens' participation in the provision of public services (Brudney & England, 1983; Levine & Fisher, 1984; Loeffler & Timm-Arnold, 2021; Percy, 1983). For instance, parents coproduce education services with school staff by helping their children with schoolwork, or citizens coproduce community services by reporting damages in their local park. As a result, coproduction ideally yields higher efficiency and effectiveness due to clients'/citizens' inputs (Eriksson, 2022). Yet, coproduction can also have negative consequences, which this dissertation aims to investigate regarding its effects on racial equity.

This dissertation addresses four general research questions: 1) Do racial disparities exist in coproduction? 2) Do the disparities vary by type of coproduction? 3) What explains racial differences in coproduction? 4) Can government initiatives, managerial arrangements to promote coproduction, alleviate racial disparities? Investigating these questions will complement the current weaknesses of coproduction literature and provide empirical evidence on the relationship between coproduction and racial equity. I study these research questions specifically in the context of coproduction in public education in the United States for a couple of reasons. Public education is a traditional and primary policy field for coproduction, and racial inequity in public

education is particularly detrimental since it could cause or exacerbate racial inequalities in educational outcomes.

### **1.1. Dominance of Normative Approach in Coproduction Studies**

The coproduction literature has taken a primarily normative approach on coproduction (Loeffler, 2020; Nabatchi, Sancino, & Sicilia, 2017; Steen, Brandsen, & Verschuere, 2018) approving the value of coproduction even before careful consideration of its potential costs, as well as benefits. The dominance of the normative view on coproduction is possibly due to the following underlying reasons.

The expected benefits of coproduction align with the core values of public administration. Although public administration scholarship has started to notice the importance of ‘social equity’ (Mary E Guy, 2021), the three dominant values of the scholarship have been efficiency, effectiveness, and economy (Dolamore & Whitebread, 2022; Mary E Guy, 2021; Stout & Love, 2017). Coproduction is meant to improve these values (Alexander, 2021; Eriksson, 2022; Levine & Fisher, 1984; Parks et al., 1981), and empirical studies of coproduction’s outcomes in education, health, public safety, urban planning, and other areas support this prediction (Jo & Nabatchi, 2019, 2021; Leino & Puumala, 2021). Hence, public management and scholars have perceived coproduction as a great way to realize the main values of public administration: efficiency and effectiveness.

Changes in public management paradigms and policy environment also contributed to taking a normative view on coproduction. New paradigms, such as the New Public Management and Governance, increased the adoption and use of coproduction in local governments (Brudney, 2020; Nabatchi et al., 2017) as these paradigms stressed a more equal role between government and citizens in the policy process (Levine & Fisher, 1984; Thomas, 2012; Whitaker, 1980).



Furthermore, fiscal constraints and crises strengthened the argument for coproduction to increase the efficiency of service delivery (Brudney & England, 1983; Levine and Fisher, 1984; Parks et al., 1981; Whitaker, 1980).

As a result of a normative view on coproduction, a major body of coproduction research focused only on the benefits when studying the coproduction's consequences (Alexander, 2021; Cepiku & Mastrodascio, 2021; Eriksson, 2022; Jakobsen, 2013; Jaspers & Steen, 2017; Steen, Brandsen, & Verschuere, 2018) and overlooked the possible negative outcomes, such as diminishing government's responsibilities, depraving accountability, increasing transaction costs, harming democracy in terms of representation, and promoting inequities and inequalities (Steen et al., 2018).

Multiple systematic literature reviews point out the lack of scholarly attention to the unintended outcomes of coproduction (Cepiku & Mastrodascio, 2021; Honingh, Bondarouk, & Brandsen, 2018; Jakobsen et al., 2019; Steen et al., 2018). For instance, more than 90% of current coproduction literature studied positive outcomes of coproduction (Voorberg et al., 2015). This prevailing lack of research on the costs of coproduction is problematic for theory building, obtaining complete knowledge on the outcomes of coproduction, and providing useful policy implications (Loeffler, 2020a; Steen et al., 2018). Insufficient scholarly attention to the relationship between coproduction and equity is specifically notable (Gazley et al., 2020; Jakobsen & Andersen, 2013; Thijssen & Dooren, 2016).

## **1.2. Coproduction and Equity**

The description of a coproduction process highlights the importance of evaluating the effects of coproduction on equity. The coproduction process determines the quantity and quality of public services by both service providers (government) and service users (citizens) (Parks et

al., 1981; Whitaker, 1980), which means that service users or citizens affect *which public services or goods to produce, as well as how much*. Thus, “Who is in, and who is out?” becomes a critical question in coproduction (Steen et al., 2018; Thijssen & Dooren, 2016).

In fact, early coproduction studies warned that inequitable access to a coproduction process poses potential dangers for policy outcomes (Levine & Fisher, 1984; Parks et al., 1981; Warren et al., 1984). In practice, citizens with majority demographic and/or higher socioeconomic status are more likely to have access to and participate in the coproduction process (Alonso et al., 2019; Jakobsen & Andersen, 2013; Parrado et al., 2013; Williams et al., 2016). The coproduction process is likely to exclude minority populations, who often are in the greatest need for the public services (Cepiku & Giordano, 2014; Cepiku & Mastrodascio, 2021; Honingh et al., 2018; Jakobsen, 2013; Jaspers & Steen, 2017). As a result, government fails to meet the minorities’ service needs and achieve intended policy outcomes (Jakobsen et al., 2019).

Unequal access to coproduction for disadvantaged groups not only harms equity and equal inclusion but also undermines initially intended benefits of coproduction: democracy and policy effectiveness. The exclusion of minorities in the decision-making process and the failure of gaining diverse perspectives from the clients/citizens diminish democratic values (Eriksson, 2022; Steen et al., 2018). Moreover, inequities in coproduction generate or worsen inequalities in public service outcomes (Alexander, 2021; Eriksson, 2022; Van Ryzin, Riccucci, & Li, 2017; Williams, Kang, & Johnson, 2016). In brief, social equity overall is a crucial value in understanding and improving the modern citizen-state interactions like coproduction (Mary E Guy, 2021; Stout & Love, 2017).

Despite these relevant concerns, coproduction research has put little effort into identifying and alleviating inequities in coproduction (Alexander, 2021; Cepiku & Mastrodascio,

2021; Eriksson, 2022; Gazley, 2021; Jaspers & Steen, 2017; Kang & Williams). Some recent studies primarily investigated the relationship between coproduction and equity in urban and health policy (Alexander, 2021; Eriksson, 2022; Eriksson, Williams, & Hellström, 2023; Leino & Puumala, 2021). Although they provide valuable findings on the negative impacts of coproduction on equity, in terms of equal access, and inclusion, they have limited explanation and generalization power because all conducted case studies. Also, the above studies do not complement another shortcoming of the existing literature: limited research specifically on racial inequity in coproduction (Gazley et al., 2020; Kang & Williams, 2019) and contributing factors that drive racial gaps in coproduction (Alonso et al., 2019; Kang & Williams, 2019).

This surprising neglect may exist because European and Australian scholars have conducted most of the coproduction studies since the 2000s (Brudney, 2020). Scholars in these regions focus less on racial disparities U.S. scholars. However, race is one of critical demographic factors for one's minority status, and it should be a main scope of studying social equity in public management and policy scholarship (Pandey, Newcomer, DeHart-Davis, McGinnis Johnson, & Riccucci, 2022; Pandey, Smith, Pandey, & Ojelabi, 2023). Indeed, coproduction research can benefit from a more in-depth empirical study on coproduction and racial equity.

### **1.3. Coproduction in Education**

Racial inequities in the coproduction process can be especially relevant in the provision of educational services, due to the critical role of coproduction in education. Whitaker (1980) claims that coproduction is especially important for policies where the policy goal is the transformation of the service user, such as in education or healthcare. For these services, public officials cannot provide “finished products” to citizens; instead, both government agents and

citizens *must* contribute inputs to achieve the intended policy outcomes. For example, teachers provide instruction, but students should do their homework, and parents should participate in school activities or help children with academic tasks (Harris & Goodall, 2008). Therefore, scholars traditionally acknowledged education as an essential policy arena for coproduction (Marschall, 2006; Ostrom, 1996; Thomsen & Jakobsen, 2015).

Coproduction of education generally refers to parental involvement in children's education, and studies usually distinguish between parental engagement at school and at home. (Harris & Goodall, 2008; Sebastian et al., 2017; Sui-Chu & Willms, 1996). Parent engagement at home involves activities like reading to their children (Jakobsen & Andersen, 2013), helping them with homework, or discussing academic issues with them (Epstein, 2018; Sui-Chu & Willms, 1996). Parent engagement at school includes contacting the school (Epstein, 2018; Sebastian et al., 2017), volunteering at school or in the classroom (Epstein, 2018; Gee, 2011; Nabatchi et al., 2017; Sharp & Rosentraub, 1981; Sui-Chu & Willms, 1996; Wang & Fahey, 2011), attending school meetings (Bifulco & Ladd, 2006; Epstein, 2018; Sui-Chu & Willms, 1996; Wang & Fahey, 2011), or participating in school fundraising (Sebastian et al., 2017; Wang & Fahey, 2011).

These various kinds of parental coproduction play a critical role in attaining policy outcomes of K-12 education: academic achievement and socialization (Honingh et al., 2020). Parent involvement encourages students' motivation to work hard and discourages bad behavior at school, which results in the positive effects of parent engagement on educational outcomes (Harris & Goodall, 2008). Empirical findings from current parent involvement studies yield support for these explanations.

Parent involvement studies find parent engagement both at home and school is a significant factor for children's educational outcomes. Various meta-analyses confirmed strong effects of parent involvement at home and school on academic performance of U.S. K-12 students (Castro et al., 2015; Jeynes, 2005, 2007; Sebastian, Moon, & Cunningham, 2017). Moreover, parents' involvement at school, such as attending school events (Shen et al., 2014), volunteering at school, and participation in parent-teacher organizations (McNeal, 2001), not only positively predicted learning outcomes, but also predicted students' behavioral sanctions (Shen et al., 2014) and social skills (Nokali, Bachman, & Votruba-Drzal, 2010).

Parental involvement both at home and school contributes substantially to children's academic achievement and social development, which suggests parent involvement can either worsen or alleviate gaps in educational outcomes (McNeal, 2001; Sebastian et al., 2017). Thus, equal access to and inclusion in coproduction is important/crucial in education. Several public management scholars have found disparities in coproduction of education and in the process (Andersen et al., 2020b; Jakobsen & Andersen, 2013; Thomsen, 2017).

However, the existing public management studies have several limitations. Most focused on coproduction at home. As parent engagement is as critical at school as at home, researchers need to have a holistic view on coproduction in education and its potential disparities.

The existing coproduction literature focuses on inequities in coproduction due to socioeconomic factors, like income and education (Andersen et al., 2020b; Jakobsen & Andersen, 2013; Thomsen, 2017) but not/rather than race. Yet, in the U.S., where racial gaps in educational outcomes are a chronic policy problem (Reardon & Robinson, 2015), racial equity in coproduction is vital. Finally, most studies reviewed only co-delivery of educational services and

excluded other crucial coproduction activities at different policy stages, such as commissioning, planning, and evaluation.

Scholars argue that coproduction occurs at diverse stages of a policy cycle and has different mechanisms at each stage; therefore, it is essential to examine coproduction activities separately at each point of the policy cycle for accurate understanding and theory building (Alonso, Andrews, Clifton, & Diaz-Fuentes, 2019; Jakobsen et al., 2019; Loeffler & Bovaird, 2019; Nabatchi, Sancino, & Sicilia, 2017). Specifically, different modes of coproduction yield different outputs and require varying levels and types of client inputs, stressing the fundamental variations in the coproduction mechanism by policy cycle.

For example, serving on school committees is coproduction at the decision-making stage, and its primary outputs are a school's policy priorities and resource allocations (Nabatchi et al., 2017). On the other hand, volunteering in a class is coproduction at the implementation stage, and the main output is a conducted class. Also, serving on school committees demands more time, knowledge, and communication skills than volunteering in a class. The mechanisms of parental coproduction are different across activities; therefore, research should study coproduction at the various stages to secure a comprehensive understanding (Thomsen, 2017). In this manner, the current coproduction research on education offers us an incomplete understanding of parents' coproduction behaviors and disparities in them due to solely studying co-delivery.

Education studies on parent involvement, nonprofit literature on parental volunteering, as well as political science studies on the social capital of parents, slightly fill in some of these gaps in revealing the true dynamics of parents' coproduction at different policy stages. Parent involvement studies found racial minority parents were less likely than white parents to

coproduce at school but not necessarily at home (Nzinga, Baker, & Aupperlee, 2009; Park & Holloway, 2013; Sui-Chu & Willms, 1996; M. T. Wang & Sheikh-Khalil, 2014; S. W. Wong & Hughes, 2006).

However, these findings also provide limited information on the relationship between coproduction and racial equity because the dominant approach to measure parent involvement is an index aggregating multiple parent engagement activities into a single measure. As a result, the measure loses the diverse aspects of parent involvement (Fan & Chen, 2001), preventing us from understanding various coproduction activities by each policy stage (Alonso et al., 2019; Jakobsen et al., 2019; Loeffler & Bovaird, 2019; Nabatchi et al., 2017).

Findings from nonprofit and social capital studies also showed white parents were more likely than minority parents to volunteer at school, attend general school meetings, or be involved in community organizations on education (Cox & Witko, 2008; M. Schneider, 2002; M. Schneider, Teske, & Marschall, 1997; L. Wang & Fahey, 2011). They only focused on certain types of parent engagement, however, overlooking other facets of parent involvement in the commissioning process, such as serving on a school committee or participating in fundraising.

In short, the most significant limitation of the existing coproduction literature in the education context is that it pays insufficient attention to producing theoretical knowledge and empirical evidence for equity in coproduction of education, including racial equity. A handful of coproduction studies have examined the issue, and they mainly investigated disparities by parents' education and income levels and only coproduction at the service delivery stage. In fact, after a literature review of parent coproduction studies, Honingh et al (2018, p.169) conclude: "Scholars paid little attention to inclusiveness of coproduction in education. Whether coproduction can mobilize all parents and what the social consequences of unequal participation

will be remains to be seen.” In other words, equal access and inclusion in coproduction is an urgent research agenda promoting equity and equality in coproduction of education as well as improving our holistic understanding of the costs and benefits of coproduction.

#### **1.4. Revisiting the Research Questions and the Organization of the Dissertation**

This dissertation aims to promote a more balanced view on the consequences of coproduction by challenging the normative approach to coproduction and the heavy focus on benefits of coproduction. It examines a crucial missing piece in theory building and improving policy outcomes of coproduction: racial equity in coproduction. Thus, this study investigates the following research questions: Are White parents more likely than minority parents to engage in coproduction at public schools and home? If so, do racial differences differ by type of coproduction at different points in the policy cycle? And, what explains the racial differences in coproduction? Finally, can government initiatives to facilitate coproduction decrease the racial gaps in coproduction?

The dissertation will have the following structure. In chapter two, I review coproduction theory, the main theoretical framework for the study, and the determinants of coproduction. Then, I will present hypotheses on my research questions based on the review. In chapter three, I will explain the data, variables, methods, and empirical strategies. Chapters four and five provide the findings of empirical analyses. In chapter four, I examine the racial differences in coproduction and the mechanisms of the disparities, which aims to answer the first three research questions. Chapter five will present findings on the effects of various government initiatives on improving the gaps in coproduction and will offer an understanding on the last research question. Finally, chapter six summarizes the findings and discusses theoretical contributions and policy implications of the study.



## Chapter II: Literature Review

### 2.1. Definition and Types of Coproduction

The core concept of coproduction theory is citizen participation in the provision of public services (Brudney & England, 1983; Levine & Fisher, 1984; Parks et al., 1981; Percy, 1983; Warren et al., 1984; Whitaker, 1980). For instance, prior scholars have defined coproduction as the “joint provision of public services by public agencies and service consumers” (Levine & Fisher, 1984), “a service delivery process which envisions direct citizen involvement in the design and delivery of city services with professional service agents” (Brudney & England, 1983), or “a mixing of productive efforts of regular and consumer producers.” (Parks et al., 1981). These definitions have two facts in common. First, the service user or citizen is a coproducer in the policy implementation of governments. Secondly, the partnership between citizens and governments typically occurs at the stage of *service delivery* (Levine & Fisher, 1984; Parks et al., 1981; Percy, 1983; Whitaker, 1980).

The scope of coproduction expanded as coproduction became a more prevalent practice and concept (Nabatchi et al., 2017). First, the range of coproducers expanded from individual service-users to include general citizens, volunteers, and nonprofit organizations (Alford, 2014; Bovaird, 2007; Nabatchi, Sancino, & Sicilia, 2017; Pestoff, 2006), overlapping with the expanded roles for coproduction participants, such as customers, partners, and citizens (Thomas, 2013). Also, scholars generally distinguish levels of coproduction such as individual, group, and collective coproduction (Brudney & England, 1983; Nabatchi et al., 2017) or individual and collective coproduction (Parrado et al., 2013). In general, collective coproduction indicates coproduction provided by citizens or citizen organizations pursuing social benefits rather than solely private benefits (Nabatchi et al., 2017; Parrado et al., 2013), while individual coproduction

and group coproduction are by clients and users of certain public services seeking personal/local benefits (Brudney & England, 1983; Nabatchi et al., 2017).

For this study, parental coproduction will include all levels of coproduction: individual, group, and collective. Parents participate in the policy implementation process as service users to seek personal benefits (the educational success of their own children) or local benefits (improvement of educational services at the school which their children attend). Parents also participate in collective coproduction in which they work with community members and organizations to support overall quality education, pursuing local and social benefits.

The second change is that the concept of coproduction started to encompass not only service delivery, but also other stages of the public service cycle (Loeffler, 2020b; Nabatchi et al., 2017). Scholars now distinguish among the various stages of policy implementation, such as commission, design, delivery, and evaluation (Bovaird, 2007; Brandsen & Honingh, 2016; Brandsen & Pestoff, 2006; Nabatchi et al., 2017; Sicilia et al., 2016; Uzochukwu & Thomas, 2018). Furthermore, they emphasize examining coproduction behaviors across these diverse stages separately due to differences in the nature and structure of coproduction at each stage (Loeffler, 2020b; Nabatchi et al., 2017; Sicilia et al., 2016; Thomas & Melkers, 1999).

This expanded approach made coproduction an umbrella concept that includes joint activities between citizens and governments in public service provision with sub-concepts, such as co-commissioning, co-design, co-delivery, and co-assessment (Bovaird & Loeffler, 2013; Nabatchi et al., 2017; Sicilia et al., 2016). In sum, coproduction does not only indicate co-delivery of public services any longer, but rather co-work activities across diverse points of policy process.

Table 1 presents examples of the different types of coproduction at each stage of the cycle. Co-commissioning refers to coproduction in prioritizing services and resource allocation (Bovaird & Loeffler, 2013) and in planning and financing the services (Bovaird & Loeffler, 2013; Nabatchi et al., 2017).

Table1. Coproduction Type by Policy Cycle

Coproduction	Definition	Examples
Co-commissioning	Coproduction activities on prioritizing services and resource allocations (Loeffler & Bovaird, 2019)	Client Representatives on commissioning boards (Loeffler & Bovaird, 2019); School staffs work with parents to identify educational priorities (Nabatchi et al., 2017); Participatory budgeting (Loeffler & Bovaird, 2019)
Co-design	Coproduction activities on encompassing user experiences into planning and arrangements of public services (Bovaird & Loeffler, 2013)	Joint work between public officials and clients to reform the application of the program or social workers work with a specific population to create new services (Nabatchi et al., 2017)
Co-delivery	Coproduction activities in direct public service provision process (Bovaird & Loeffler, 2013; Thomas, 2013).	Parent and school workforce provide in-class or school activities together (Pestoff, 2006); students help university events (Brandsen & Honingh, 2016)
Co-assessment	Coproduction activities on monitoring and evaluating public services (Bovaird & Loeffler, 2013; Nabatchi et al., 2017)	Tenant at public housing serves on inspection (Bovaird & Loeffler, 2013);Parents and education auditors assess educational services for children (Sicilia et al 2016)

Parents’ participation in prioritizing educational services with the school workforce are good examples of co-commissioning (Nabatchi et al., 2017). Co-design indicates the activities encompassing user experiences into (re)arrangements of public services (Bovaird & Loeffler,

2013; Nabatchi et al., 2017). For instance, parents of special-needs students can provide their input on how to design special needs assistance programs at school (Nabatchi et al., 2017). Co-delivery is joint activities between public officials and clients in the direct public service provision process (Bovaird & Loeffler, 2013; Thomas, 2013), and it is the most traditional and common type of coproduction. For instance, parents co-deliver education by providing their time and effort at school activities, such as volunteering in the classroom (Pestoff, 2006). Finally, co-assessment refers to coproduction activities focused on monitoring and evaluating public services (Bovaird & Loeffler, 2013; Nabatchi et al., 2017). Parents involved in a school auditing process (Sicilia et al., 2016) is an example.

These different types of coproduction indicate that we need to study coproduction as multi-dimensional and address the potential differences in participation, representation, and the consequences of coproduction process across diverse stages of policy implementation (Bovaird & Loeffler, 2013; Sicilia et al., 2016). Clearly, to serve on a school committee and to volunteer at a school event are different types of coproduction. The former is co-commissioning, and the latter is co-delivery. A parent on a school committee can coproduce priority-setting for school resources and programs, while they contribute their time and labor to produce direct educational services when volunteering at the school. Inputs in terms of skills, knowledge, and commitment required for each coproduction type will vary. Thus, it would be misleading to treat various coproduction activities equally and investigate them as an aggregated value measure as many parent involvement and volunteering studies have previously done.

Hence, this study adopts the umbrella concept of coproduction and investigates racial variations in coproduction across different types of coproduction activities. This approach also differentiates this study from previous public management studies, which studied coproduction

in education only with co-delivery measures (Andersen et al., 2020; Jakobsen, 2013; Jakobsen & Andersen, 2013; Thomsen, 2017; Thomsen & Jakobsen, 2015). Particularly, this study focuses on co-delivery and co-commissioning activities for two main reasons.

First, co-delivery and co-commissioning are the most common coproduction activities in public education; Therefore, studying both activities are necessary to provides a more precise and useful description of coproduction in K-12 education. Current public management scholars focus on co-delivery by parents at home (Andersen et al., 2020; Jakobsen, 2013; Jakobsen & Andersen, 2013; Thomsen, 2017; Thomsen & Jakobsen, 2015), whereas parent involvement activities are diverse and range from co-delivery at home to coproduction at school like volunteering and decision-making (Christensen et al., 2016; Epstein, 2018; Murray et al., 2019). No Child Left Behind (NCLB) demanded that schools practice more coproduction with parents at school, including involving the parents in school governance (Sebastian et al., 2017; Wang & Fahey, 2011), which is a form of co-commissioning.

Second, co-delivery and co-commissioning may have different implications for equity. the magnitudes of inequities in accessing coproduction process would vary by types of coproduction, since different types of coproduction require different levels of skill and resources (Thijssen & Dooren, 2016). Unequal access to co-commissioning could be greater because it requires higher level s of knowledge or skills (Loeffler, 2020b). For instance, serving on a school council requires more advanced communication skills and educational experiences than attending a school meeting or even assisting a teacher in a classroom. Moreover, co-commissioning typically involves only a limited number of individuals, likely involving those parents with affluent resources and abilities (Bovaird & Loeffler, 2013).

Several recent public management research studied the issues of equity and inclusion specifically in co-commissioning, supporting the above theoretical claim; In housing policy context, clients with higher economic and political resources were more likely to participate in the coproduction process at the decision-making stage (Alexander, 2021); patients with higher education, more social capital, and minor health issues mainly served as patient representativeness in the co-commissioning process (Eriksson, 2022); co-commissioning activities in healthcare offered unequal access for minorities like low-income and immigrant (Eriksson et al., 2023).

The consequences of inequities in co-commissioning could also be more harmful. The exclusion of minorities in the co-commissioning process results in leaving out minorities' needs, since the essential output of co-commissioning is "policy priorities and resource allocations," such as preferred services and spending (Bovaird & Loeffler, 2013). Indeed, limited access to co-commissioning for minorities led to limited policy outcomes, excluding minority groups' needs in verifying policy priorities and alternatives (Alexander, 2021; Eriksson, 2022; Eriksson et al., 2023; Leino & Puumala, 2021). As a result, inequities in accessing co-commissioning also reinforce prevailing inequalities in public service provisions and policy outcomes (Alexander, 2021).

In short, inequities in co-commissioning of public education would lead to overlooking minority students' educational needs and worsening the disparities in educational outcomes. Yet, the importance of equal participation in co-commissioning does not diminish the value of equal inclusion in co-delivery. As discussed in the introduction, previous parent involvement literature demonstrated parents' inputs in co-delivery activities including volunteering, attending meetings, or helping schoolwork are crucial for students' educational outcomes in K-12 education.

Therefore, this study will focus on two specific coproduction activities in public education: co-delivery and co-commissioning.

## **2.2. Determinants of Coproduction**

This section reviews the literature on individual-level determinants of coproduction, such as demographic factors, abilities, and resources, which could help explain racial disparities. The review also entails institutional-level determinants, especially organizational efforts to manage a coproduction process. The latter assist in generating propositions on impacts of the government initiatives, managerial arrangements to promote coproduction, on improving racial gaps in coproduction and coproduction level.

### ***2.2.1. Demographic Factors***

Age, gender, and race are three primary demographic factors in the context for examining coproduction. Since the main interest of the study is racial differences in coproduction, age and gender will serve as controls in the later empirical analyses rather than independent variables.

**Age and Gender.** Coproduction studies present inconsistent findings on age and gender. Some scholars found a positive effect of age on coproduction (Alonso et al., 2019; Bovaird et al., 2016; Kang & Williams, 2019; Parrado et al., 2013; Uzochukwu & Thomas, 2018; Zhang et al., 2020), but others found no impact (Alford & Yates, 2016; Clark & Brudney, 2017; Hattke & Kalucza, 2019; Thomsen, 2017; Wang & Fahey, 2011). Studies using a squared term confirmed the non-linear effect of age with middle-aged people being most likely to coproduce (Alonso et al., 2019; Thijssen & Dooren, 2016), possibly accounting for these inconsistent findings. Different effects of age by type of public service could also explain the inconsistent results on age's effect.

Findings on gender are also inconsistent. Women are generally more willing to coproduce (Zhang et al., 2020) in diverse policy contexts (Alonso et al., 2019; Bovaird et al., 2016; Conway & Hachen, 2005; Egerton, 2002; Parrado et al., 2013). However, some studies did not find any gender difference (Alford & Yates, 2016; Clark & Brudney, 2017; Kang & Williams, 2019; M. Schneider, 2002; Thomsen, 2017). The mixed results potentially could be due to differences in the types of coproduction examined. Females showed a higher chance of participating in coproduction for social benefits (Alonso et al., 2019; Tony Bovaird et al., 2016; Parrado et al., 2013), while studies found no gender difference in coproduction for private benefits (Clark & Brudney, 2017; Thomsen, 2017).

**Race.** Despite early coproduction scholars' concerns on inequitable accesses to coproduction for those with lower socioeconomic status, including minority populations (Levine & Fisher, 1984; Warren et al., 1984), only a few coproduction studies included race as a primary variable of interest or discussed the results of race variables. Moreover, most only examined Black-White differences, leaving out other racial minorities. Still, current literature provides some information on the relationship between race and coproduction.

African-Americans are more likely than Whites to co-plan in local public goods as they are more likely to attend city council meetings or community association meetings (Uzochukwu & Thomas, 2018) or are more willing to coproduce policing by helping with anti-crime police initiatives (Wehrman & de Angelis, 2011).

In contrast, other studies found no statistically significant racial disparities in coproduction regarding contacting officials or attending meetings for education and crime (Marschall 2004), tenant meetings at public housing (Conway & Hachen 2005), and agreeing on



screening at the airport for public safety (Zhang, Liu, & Vedlitz, 2020). These findings imply that being a racial minority does not necessarily decrease coproduction levels.

However, these findings should be taken with caution, based on several factors. All of these studies used surveys conducted in large U.S. cities, such as Atlanta (Uzochukwu & Thomas, 2018), large Western cities (Wehrman & de Angelis, 2011), Detroit (Marschall, 2004), and Boston and LA (Conway & Hachen, 2005), which plausibly contributed to the findings since the overall level of coproduction is higher for urban areas (Bovaird et al., 2015) and urban areas also generally have a higher proportions of minority residents.

Additionally, some studies have limitations of selection bias (Conway & Hachen, 2005; Uzochukwu & Thomas, 2018; Zhang et al., 2020). For instance, people who use air transportation services potentially share higher socioeconomic status (Zhang et al., 2020). In contrast, people in public housing programs are likely to share lower income (Conway & Hachen, 2005). In both cases, plausible sample biases could result in inaccurate effects of race. The respondents are also simply different from the general population due to nonrandom sampling or due to uniqueness of the area. For example, Atlanta is a predominantly African-American city; therefore, African-Americans could show more active involvement (Uzochukwu & Thomas, 2018).

A more recent study not only found the effect of race on coproduction, but also provides a clue as to why previous studies have not found racial disparities. Kang & Williams (2019) found that Blacks were less likely than Whites to contact police as they have higher negative attitudes towards police. In other words, race *indirectly* affected the likelihood of coproduction through perceptions of government officials. A majority of previous studies included race as a control variable rather than a primary independent variable of interest (Conway & Hachen, 2005;

Marschall, 2004; Uzochukwu & Thomas, 2018; Zhang et al., 2020), which possibly contributed to missing the total effect of race.

Additionally, since the dynamics of coproduction vary by policy arena, we should be careful when applying findings from one policy arena to others (Alonso et al., 2019; Thomas & Melkers, 1999; Uzochukwu & Thomas, 2018). This finding indicates that the impact of race might be different for coproduction in education compared to coproduction in community services, public safety, and public housing that previous research examined. In fact, studies on parent involvement, parent volunteering, and parents' social capital offers empirical evidence of racial disparities in coproduction of K-12 education.

Parent involvement studies documented racial gaps in parent involvement at school but not necessarily at home (Cherng & Ho, 2018; Park & Holloway, 2013). Black parents were less likely to engage in school activities than White parents (Nzinga et al., 2009; Park & Holloway, 2013; Sui-Chu & Willms, 1996; M. T. Wang & Sheikh-Khalil, 2014; S. W. Wong & Hughes, 2006). Hispanic parents and Asian parents also showed lower levels of parent involvement at school than White parents (Antony-Newman, 2019; James, Rudy, & Dotterer, 2019; Nzinga et al., 2009; Park & Holloway, 2013; Sui-Chu & Willms, 1996; Tang, 2015; S. W. Wong & Hughes, 2006). Hispanic and Asian parents tended to be less likely to participate in school activities due to their lack of language proficiency and understanding of the U.S. education system (Antony-Newman, 2019; Tang, 2015); However, US-born and college-educated Hispanic and Asian parents were still less likely than comparable White parents to participate in school activities (Cherng & Ho, 2018).

Although education studies provide useful insights on racial disparities in coproduction of public education, their findings offer incomplete information on racial disparities in

coproduction. Parent involvement studies' dominant approach to measure parent engagement is an index. For instance, the parent involvement at school variable combines various types of school activities at different policy stages, such as communication with teachers and staff, school meetings, parent-teacher meetings, volunteering, school committees, and PTO meetings as a simple one index value. All the above studies measured parent involvement as an index, which prohibits a more in-depth understanding of racial gaps in parent involvement across diverse coproduction activities. Therefore, studying this issue with coproduction theory will be complementary.

Some nonprofit and social capital studies show racial differences in parent involvement in volunteering and attending school events. Non-Hispanic white parents are more likely than Black, Hispanic, Asian, and other-race parents to volunteer at school or any educational organizations (Cox & Witko, 2008; L. Wang & Fahey, 2011). White parents were more likely to volunteer at school and to be PTA members than Black or Hispanic parents, but White and Asian parents did not differ (Schneider, 2002; Schneider et al., 1997). An additional longitudinal study with a nationally representative sample provides stronger evidence on racial disparities in parental involvement. Asian and Hispanic parents are less likely to volunteer at school than White parents, and Black parents were less likely to attend school events than White parents (Cox & Witko, 2008). Yet, again, nonprofit, and social capital studies do not provide much understanding on racial gaps in co-commissioning.

Based on the limitations of current coproduction literature on racial differences and empirical evidence from parent involvement and volunteering/social capital studies, I conclude racial disparities are likely to exist in both co-delivery and co-commissioning.

*H1: Non-Hispanic white parents are more likely to co-deliver and co-commission than parents of other races*

Furthermore, based on the earlier theoretical arguments on the different levels of disparities across coproduction activities (Bovaird & Loeffler, 2013; Thijssen & Dooren, 2016), I predict the following hypothesis:

*H2: Racial differences will be larger for co-commissioning than for co-delivery.*

### **2.2.2 Abilities and Resources**

Coproduction theory argues one must have abilities and resources to participate in coproduction (Levine & Fisher, 1984; Powers & Thompson, 1994; Sharp & Rosentraub, 1981). This prediction is intuitively straightforward, considering the coproduction concept indicates the provision of public services includes both public officials' and clients' (or citizens') inputs. One must have some skills and resources to offer. For example, one can only donate money for their child's school if one has available monetary resources. Or citizens can co-deliver a recycling collection only when they have knowledge of which kinds of items to recycle and have recycling bins. In other words, willingness alone does not secure the actual coproduction behavior unless one has necessary capacities. Therefore, scholars have emphasized the significance of abilities and resources on coproduction participation.

**Abilities: Knowledge and Communication Skills.** Abilities to coproduce refer to knowledge or skills essential to participate in the coproduction process (Brudney & England, 1983; Jakobsen & Andersen, 2013; Percy, 1983; Sharp & Rosentraub, 1981; Warren et al., 1984). The knowledge can refer to understanding of general institutions or rules, but it also encompasses specific information on coproduction (Alford, 2002; Levine & Fisher, 1984).

Education level is a common indicator for ability in terms of knowledge in coproduction literature.

Previous research has shown that education level positively affects the probabilities to coproduce in numerous policy arenas. In the environmental sector, as education level increases, the level of coproduction behaviors, such as recycling, buying eco-friendly products, reducing energy usage at home, volunteering for environmental efforts, or being a member of an environmental organization, increased substantially (Alonso et al., 2019). More educated people were more likely to coproduce public safety too. Higher levels of education led to higher chance to accept strict searches and gun control at the airport (Zhang et al., 2020) and to assist police on neighborhood security (Wehrman & de Angelis, 2011). This positive relationship remains with coproduction of education. Citizens with more years of education were more likely to attend community meetings about schools (Marschall, 2004), and parents with higher education level were more likely to be members of PTA and to volunteer at school (Schneider, 2002; Wang & Fahey, 2011).

Specifically, having a college degree substantially impacts coproduction by parents. Mother's higher education degree was the strongest factor to predict coproduction in developing child's language (Jakobsen & Andersen, 2013). A college degree is a crucial predictor for parent engagement at school (Gee, 2011; Nzinga et al., 2009; Park & Holloway, 2013). Generally, higher education status is a consistent predictor across policy arena for citizen participation (Egerton, 2002).

Existing literature also presents that specific knowledge regarding coproduction matters. Jakobsen (2013) found providing books and information on how to develop child's language increased parents' coproduction at home. Thomsen (2017) also found parents were more than

twice as likely to read with their children weekly when they had information on how to read effectively. Issue-specific knowledge regarding public safety also positively impacted the coproduction of airport security (Zhang et al., 2020). Parents with higher education level would have both overall and specific knowledge on coproduction of education through their educational attainments and experiences.

Finally, communication skills are critical to be part of the coproduction process (Levine & Fisher, 1984). For instance, language status was a critical factor for parents to be able to coproduce their children's learning (Bifulco & Ladd, 2006; Jakobsen & Andersen, 2013) and Hispanic parents identified language as the most challenging barrier to involvement in school activities (Lopez & Donovan, 2009).

Gaps in knowledge and communication skills can lead to gaps in coproduction. In the U.S., racial gaps in education have been constantly apparent. Furthermore, Asians and Hispanics tend to have lower English proficiency than other racial groups, because they are more likely to be immigrants. Immigration status additionally could affect one's knowledge to coproduce, due to being new to a culture, society, and country. Therefore, I hypothesize:

*H3: Differences in education, immigration status, and language proficiency help explain racial differences in co-delivery and co-commissioning.*

**Resources.** Citizens or service users need resources like time, money, or labor to participate in a coproduction process (Bovaird & Loeffler, 2013; Brudney & England, 1983; Parks et al., 1981). Current coproduction literature, parent involvement studies, and nonprofit studies offer solid empirical evidence for the argument.

**Non-Financial Resources: Time.** Researchers have emphasized the critical role of time in coproduction (Parks et al., 1981; Percy, 1984; Powers & Thompson, 1994; Uzoichukwu &

Thomas, 2018). When parents volunteer at school, they offer their time to the school rather than doing other activities. As another example, recycling requires more time than simply disposing of garbage. Therefore, one needs time as a primary resource to coproduce.

Lack of time negatively affected the likelihood to coproduce (Jakobsen, 2013; Uzochukwu & Thomas, 2018). In provision of local public goods, respondents who perceived that they have no time demonstrated lower levels of co-planning as they were less likely to attend city council and community meetings, as well as lower levels of co-monitoring, since they were less likely to contact for code violations, service problems, or sharing feedback with public officials even after controlling for sociodemographic factors and needs (Uzochukwu & Thomas, 2018).

Also, Jakobsen (2013) found that time was a crucial resource for parent's coproduction at home even after controlling for needs, teacher's efforts, and various child and family characteristics. On average, parents who reported having time were 1.5 times more likely to read to their children than the parents who did not. Moreover, the government's program to encourage parents' coproduction did not have much impact on parents who reported having no time. In other words, government supports that provided specific information and materials for coproduction were not effective unless parents had time, which highlights the importance of time as resources to coproduce.

Parent involvement and volunteering studies have constantly showed that time is an essential resource (Vinopal, 2016). Their empirical evidence also demonstrates the importance of time for coproduction activities at school, which the existing coproduction literature does not offer. For instance, parent involvement at school, such as volunteering in the classroom or attending various meetings, requires time as the primary input (Gee, 2011). Mothers with full-

time jobs were less likely than stay-at-home mothers to volunteer at school or in class and spent less hours on school activities (Gee, 2011). Single parents were also less likely than comparable co-parenting parents to volunteer at school or participate in parent teacher organizations (Sui-Chu & Willms, 1996). Married parents were more likely than non-married parents to coproduce at school (Wang & Fahey, 2011), suggesting two-parent status increases parents' coproduction level. Thomsen (2017) found the number of children negatively affected parents' chances to read with their child.

Single parent status is probably the most common measure for parents' time resources (Sui-Chu & Willms, 1996; Thomsen, 2017). Time is a universal barrier that parents identify to attend school events, and single parents are more restricted with time and participate the least in school activities (Harris & Goodall, 2008), due to being solely responsible for life obligations normally split between two parents.

In the U.S., notable racial disparities exist in the proportions of single parents. In 2021, only 25% of white children lived in single-parent households, compared to 65% of black children, 42% of Hispanic children, and 50% of Native American children. This general pattern has been consistent with American Community Surveys (ACSs) since 2010 (Foundation, 2023). As studies have used and found single parent status as a valid indicator for parents' time resource, racial differences in coproduction can be due to variations in single parent status across parents' racial and ethnic groups.

*H4: Differences in single parent status help explain racial differences in co-delivery and co-commissioning.*

**Financial Resources.** Financial capacity is also a critical resource for coproduction. Parents need money to buy class materials for their children or donate money for school



education programs. Also, materials or equipment are critical resources to be able to coproduce (Alford, 2002; Brudney & England, 1983; Jakobsen & Andersen, 2013; Percy, 1984). For instance, in education you need to have books to read to your children (Jakobsen & Andersen, 2013) or transportation, potentially a car, to give your children a ride to or to attend various school events. In an example from another sector, coproduction of public safety requires purchase of locks and alarms (Alford & Yates, 2016; Bovaird et al., 2015). For these reasons, scholars have paid attention to income as one of the basic determinants of coproduction in addition to education (Levine & Fisher, 1984; Parks et al., 1981; Warren et al., 1984).

Income strongly predicts coproduction behavior. The level of income positively predicted the level of coproduction index for public safety based on having an alarm, theft insurance, or outside lights (Schneider, 1987). Parents with higher income were more likely to volunteer at school or serve on a committee (Cox & Witko, 2008; Wang & Fahey, 2011), attend school events, and attend PTA meetings (Cox & Witko, 2008). In general, non-Hispanic whites earn higher incomes than the other racial groups in U.S. According to the 2018 General Social Survey, 25% of non-Hispanic whites reported that their family income is above the average income while only 12% of blacks and 9% of Hispanics did. Thus, the racial disparities in coproduction can partly be due to disparities in financial resources among racial groups.

*H5: Differences in income help explain racial differences in co-delivery and co-commissioning.*

### **2.2.3. Satisfaction with Government**

While early coproduction scholars emphasized the significant effects of abilities and resources on access to a coproduction process, later scholars started to investigate the correlations between user's experiences with governments and coproduction level. The existing literature provides somewhat inconsistent but helpful knowledge on the impacts of experiences

with government in multiple aspects: satisfaction with public services, public information, government outreach, and interactions with public officials.

Some research found satisfaction with public services negatively correlates to coproduction level. Scholars argue dissatisfaction with government motivates people to engage in coproduction (Eijk & Steen, 2016), as they perceive their needs are not being met (Uzochukwu & Thomas, 2018). People were less likely to report that they will co-work with police for community safety as their satisfaction with service increased (Wehrman & de Angelis, 2011). Citizens who perceived lower service quality and lack of service were more likely to report code violations or service problems (Uzochukwu & Thomas, 2018). Bovaird et al (2015) found as the level of satisfaction with government performance increased, the level of coproduction decreased in environment, health, and public safety. Satisfaction with recycling services negatively affected the coproduction index calculated based on diverse coproduction behaviors, such as recycling, switching to a green energy supplier, gardening for wildlife, being a member of a climate change group, etc. (Alonso et al., 2019).

Despite current literature offering relatively consistent findings, generalization of the negative impact of satisfaction with government on coproduction requires caution. All of the above studies that found the negative relation between satisfaction with public services and coproduction level only examined co-delivery measures. Satisfaction with government programs would not necessarily have the same effects on other coproduction activities. For instance, as satisfaction level increased, citizens were less likely to co-deliver on reporting violations and problems, but not less likely to co-plan, like attending various types of meetings (Uzochukwu & Thomas, 2018). Furthermore, Conway & Hachen (2005) used a grievance index to measure

perception on the government performance regarding quality of city services and found no relation between the grievance level and attendance at tenant meetings.

Moreover, other studies show the positive effects of satisfaction with government regarding public information, government outreach, and interaction with public officials on coproduction. Satisfaction with information that the government provided increased the coproduction level (Bovaird et al., 2015) or the amount of time citizens are willing to spend on diverse coproduction behaviors in health, environment, and neighborhood safety (Bovaird et al., 2016). Also, satisfaction with government outreach that asked for citizens' input were positively correlated with time a person would spend on coproduction (Bovaird et al., 2016). Positive interaction with public officials made a difference too. Higher satisfaction with police led to higher likelihood to coproduce (Wehrman & de Angelis, 2011). Kang & Williams (2019) found that negative attitudes driven by direct interaction with police officers decreased the likelihood to contact police in the future. However, these findings are also limited to be generalized to coproduction behaviors since the studies mainly examined willingness to coproduce as opposed to actual engagements in coproduction.

Some findings from social capital and parent involvement studies offer additional insights and show that satisfaction with government within K-12 education context rather positively leads to coproduction by service users. Parents who reported dissatisfaction with their child's school (Schneider & Marschall 1997) and who often thought about moving schools for a child (Schneider, 2002) were less likely to volunteer at school or join the PTA. Using a longitudinal study of a nationally representative sample, Cox & Witko (2008) verified the negative causal impact of the dissatisfaction index on attending events/PTA meetings and volunteering at school. The finding additionally suggests the positive relation between

satisfaction with public information and parent's coproduction level, since the dissatisfaction index primarily utilized the questions asking about the school's performance on offering information: child's progress between report cards, knowledge of child development, volunteering opportunities, and helping child's learning at home.

In sum, existing coproduction studies imply satisfaction with government regarding public information, encouraging participation, and interaction with public officials would positively affect parents' coproduction in K-12 education. On the other hand, the current literature shows rather mixed findings on the effect of satisfaction with government in terms of public service, which varied by policy stages of coproduction. The empirical evidence from parent involvement studies supports the overall positive impacts of satisfaction with government at the multiple aspects, showing satisfaction with school positively predicted parents' engagement at school. As experiences with government would vary across racial groups, differences in satisfaction with government might explain racial differences in coproduction.

*H6A: Overall satisfaction with school increases co-delivery and co-commissioning.*

*H6B: Differences in overall satisfaction with school help explain racial differences in co-delivery and co-commissioning.*

#### ***2.2.4. Government Initiatives to Promote Coproduction***

Scholars have claimed that coproduction management at the government level is crucial for several reasons. First, managerial arrangements enable the coproduction process to attain and maintain the necessary level of inputs from service users/citizens (Brudney & England, 1983; Parks et al., 1981; Whitaker, 1980). Coproduction gains like efficiency and policy effectiveness only occur when users/citizens offer their inputs into the coproduction process (Levine & Fisher, 1984; Whitaker, 1980), which implies that securing the right degree of input from these clients is

important. However, in practice, clients might not provide the required levels of input due to a lack of abilities, resources, or incentives. Therefore, governmental arrangements, especially ones that adjust citizens' costs and benefits of participating in coproduction, are essential to facilitate coproduction (Brudney & England, 1983; Parks et al., 1981).

Second, more importantly, coproduction management matters to resolve and prevent potential harm to equity as a result of coproduction (Percy, 1984). The natural setting of coproduction creates self-selection problems (Sicilia et al., 2019) by encouraging highly educated and wealthier people to coproduce while creating barriers to disadvantaged groups' participation. This imbalance demands government actions to allocate resources for those minorities to access coproduction (Parks et al., 1981; Percy, 1984; Sicilia et al., 2019). For these reasons, it is vital for coproduction studies to investigate which government approaches either facilitate or impede coproduction (Brudney & England, 1983; Parks et al., 1981; Percy, 1984; Whitaker, 1980). Scholars offered several suggestions and empirical findings on what the essential elements of the institutional arrangements for a coproduction process should be.

A few researchers have argued that providing incentives, either monetary or non-monetary, is important to facilitate coproduction. Public officials should design a coproduction process that incentivizes client/citizen participation, such as monetary rewards or feedback to service users on their inputs (Levine & Fisher, 1984). Sharp & Rosentraub (1981) also argued incentives are critical to secure coproduction by clients and citizens.

However, they additionally emphasized the importance of assisting abilities and resources to coproduce by proposing three coproduction management strategies: information; facilitation; and incentives. Information strategy offers knowledge to coproduce. For example, health departments can conduct a campaign that distributes information on the hazards of

smoking and encourages citizens not to smoke. They claim the information approach alone cannot be effective and argue that a facilitation strategy, providing resources, and an incentive strategy, offering incentives to increase motivation, should accompany. Still, the significance for each strategy will vary depending on policy context and the type of coproduction (Sharp & Rosentraub, 1981).

Percy (1984) puts even more weight on administrative support to improve clients' abilities and resources to coproduce. He suggested three components of coproduction management: interaction between government and clients; assistance to coproducers; and rules and procedures of coproduction. He argues that the coproduction process should facilitate the interaction between government officials and clients that enables clients to adopt knowledge to coproduce. Thus, outreach programs or decentralization of service delivery will be helpful. While interaction between public officials and clients indirectly increases clients' abilities to coproduce, direct assistance offering necessary knowledge through training programs or distribution of resources are also vital. For instance, police agencies may offer property-marking equipment or public works departments can lend tools for cleaning streets or neighborhoods. Finally, administrative rules and procedures that are difficult, unpleasant, or expensive prevent service users from participating in coproduction.

Powers and Thompson (1994) underscored providing role clarity as the primary facet of coproduction management in addition to providing specific knowledge and equipment to coproduce. Particularly, governments and public officials should focus on providing clear guidance on the expected roles of service-users or citizens as coproducers. Powers and Thompson (1994) studied two coproduction cases: parent involvement at school and garbage collection. Local schools' implementation of parent training programs increased parents' help

with children's study and participation in PTA. The programs aimed to improve parents' understanding on their expected role in coproduction of educational outcomes as well as provide specific knowledge on how. The positive effects of providing information on the expected role, specific knowledge to coproduce, and equipment remained the same with the waste collection. The authors maintain that managerial practices help citizens to have knowledge of a clear understanding on their expected role in coproduction matter as much as assisting knowledge on how to coproduce and resources.

In brief, scholars agree on and offer some fundamentals of management strategies for a coproduction process. First, government programs or management practices to attain and sustain the right level of service user (citizen) inputs are mandatory, not optional. Second, it is important to design a coproduction process that provides users/citizens resources and increases their abilities, especially knowledge, to coproduce. Third, government initiatives to encourage coproduction behaviors should be multi-dimensional. For instance, managers should not just provide knowledge or tools; they should offer resources, information on understanding of expected roles and how to coproduce, and incentives. Finally, suitable arrangements for coproduction process differ by policy context (Sharp & Rosentraub, 1981) and type of coproduction (Sharp & Rosentrau, 1981; Sicilia et al., 2019): co-commissioning, co-planning, co-delivery, and co-evaluation (Sicilia et al., 2019).

These rather theoretical explanations on the necessity and impacts of institutional arrangements for a coproduction process additionally provide some useful implications for studying the racial disparities in coproduction of K-12 education. Initially, in a natural setting, it is inevitable for racial minority parents to face challenges in accessing coproduction processes; thus, government's attention to the potential exclusion and administrative assistance is crucial.

Moreover, with the appropriate approach, government initiatives or programs facilitating coproduction can not only promote coproduction by racial minorities but also potentially alleviate existing racial gaps. Indeed, empirical findings from the existing coproduction literature not only support the discussed theoretical arguments but also support the significance of government initiatives on improving racial equity in coproduction.

Many coproduction studies confirmed the general positive impacts of government initiatives, like administrative arrangements for a coproduction process to support abilities and resources, on coproduction behaviors. Regarding abilities, existing empirical research demonstrates the importance of providing knowledge in securing and encouraging coproduction participation. Knowledge examples include information on the expected role and importance of coproducer's inputs (Andersen et al., 2020; Parrado et al., 2013), coproduction opportunities (Marschall, 2004), and how to coproduce (Jakobsen, 2013; Parrado et al., 2013; Schneider, 1987). Offering required resources for coproduction, such as equipment or tools, also increased coproduction levels (Andersen et al., 2020; Jakobsen, 2013; Schneider, 1987).

Some studies examined government initiatives primarily providing knowledge to coproduce. Marschall (2004) found informing citizens about coproduction opportunities increased coproduction of education and crime services. Citizens who had been contacted about relevant meetings or events were more likely to attend the meetings and contact public officials on school and crime matters of their community. Parrado et al (2013) also offered empirical evidence on the positive effects of inviting citizens: notifying of coproduction opportunities and asking for inputs. Parrado et al (2013) additionally found that government provision of information had a positive effect. Higher satisfaction with the government's information provision on coproduction led to higher levels of coproduction of health. However, the effect did



not exist for coproduction in environment and public safety, supporting scholar's propositions that effective government initiatives would vary by policy arena (Sharp & Rosentrau, 1981; Sicilia et al., 2019).

Importantly, though, another experimental study presented no causal impact of providing information on coproduction. Parents in a treatment group received booklets providing knowledge on how to coproduce and the value of parents' inputs, but they did not differ in coproduction levels in terms of reading to a child from parents in control groups (Thomsen & Jakobsen, 2015). This opposite finding could be due to the differences in the policy arena or methodological approach from the previous studies. Or, it is potentially due to the fact that the government initiatives should offer assistances for both resources and abilities to promote coproduction effectively (Powers & Thompson, 1994; Sharp & Rosentraub, 1981; Sicilia et al., 2019). Studies that examined government initiatives aiding both abilities and resources to encourage coproduction show the overall positive effects of offering information and supplies on coproduction in public safety and education. Furthermore, the findings suggest the government initiatives potentially alleviate disparities in coproduction participation.

Schneider (1987) studied the effect of a crime prevention program in Portland, Ohio, which offered informational brochures as well as equipment, such as property signs and anti-burglary stickers through block watch meetings. Residents who received information and resources showed higher levels of coproduction behaviors in protecting neighborhood and private properties. Moreover, the effect of the program was higher for low-income residents, suggesting the potential moderating effect of government outreach programs on improving the coproduction of minority populations. Still, study is not free from self-selection bias. Residents

who attended the block meetings could be more likely to be interested in public safety which caused their higher level of coproduction.

To avoid self-selection bias, some researchers used experimental methods in investigating the effect of government initiatives on coproduction, finding a strong causal effect of government practices to facilitate coproduction. They also found a larger effect of the initiative or minority service users.

Jakobsen (2013) conducted a random assignment experiment for parents whose children attending primary schools in Denmark. Parents in a treatment group received a language suitcase, which had basic tools for coproduction, such as books, games, video tutorials, and a guidebook on how to develop children's language skills. The results showed that parents in the treatment group read to their children more often than parents in the control group.

Moreover, the effect was larger for parents with less fluent Danish, indicating that government efforts alleviated minorities' inequitable access to coproduction (Jakobsen, 2013). Andersen et al (2020) also conducted an experiment, which offered the treatment group two elements: *information* on the importance of parents' input and *resources* to coproduce, such as books. Results showed parents in the treatment group were more likely to help children with homework than parents in control group. Also, the positive effects of informing the significance of parent's role, supports the proposition that enhancing a clear understanding on their expected role increases coproduction (Powers & Thompson, 1994).

The overall level of government efforts to facilitate coproduction also positively predicts coproduction behaviors (Marschall, 2004) specifically in coproduction of education. An increase in a school initiative index, which measured various school efforts to involve parents, like providing information on how to help a child with learning, encouraging parents' feedback, and

teachers interacting with parents, increased parent engagement at both home and school. Moreover, the effect was twice as big for Latino-dominant schools, again displaying the possibility for government programs to facilitate coproduction to have an alleviating effect on racial disparities in coproduction.

Concisely, the existing empirical studies confirm the theoretical argument on the positive impacts of government initiatives promoting coproduction; moreover, they show the possibility of government initiatives to improve the inequitable access to coproduction for minority populations (Jakobsen, 2013; Marschall, 2004; Schneider, 1987). The moderating impact of coproduction management on minority disadvantage is specifically critical for education or health policies where coproduction by service user or citizens is a fundamental ingredient for policy effectiveness (Whitaker, 1980). Improving gaps in coproduction levels in those policy arenas can also help prevent or alleviate disparities in policy outcomes. In fact, Jakobsen & Andersen (2013) found that government programs to facilitate coproduction by providing information and resources had a higher positive impact on learning outcomes of children from low-income families. Based on the discussed theoretical arguments and empirical findings, I provide the following propositions.

*H7A: Government initiatives, providing information on the expected coproduction role and how to coproduce, increase co-delivery and co-commissioning*

*H7B: The above government initiatives decrease racial differences in co-delivery and co-commissioning*

Furthermore, based on the significant role of language proficiency in accessing coproduction process and positive effects of government initiatives assisting abilities in terms of

knowledge, I expect government initiatives aiding another type of ability, language skills would also affect coproduction level positively. Thus, I also present the next propositions.

*H8A: Government initiatives offering assistance with language skills increase co-delivery and co-commissioning*

*H8B: The government initiatives decrease racial differences in co-delivery and co-commissioning*

## Chapter III: Data and Methods

### 3.1. Data

This dissertation uses the National Household Education Survey (NHES) conducted by the National Center for Education Statistics (NCES), specifically the Parent Family Involvement (PFI) survey. The PFI survey is a nationally representative sample of children from kindergarten to high school, including homeschoolers. Parents completed a questionnaire on child, parent, and family characteristics and on parent involvement. Additionally, I use Common Core Data (CCD) by the US Department of Education as a complementary data source for school-level control variables. CCD is an annual data for all K-12 schools in the U.S. and the data has information on school population and student characteristics.

#### 3.1.1. Sample

**Sample Design.** PFI data has a complex survey design rather than a simple random sampling design. The sample design was a two-stage stratified Address-Based Sample (ABS). In the first stage of the survey, NCES established a stratification to oversample Blacks and Hispanics to secure enough minorities. NCES categorized the addresses to three mutually exclusive strata: census tracts with 25% or more Blacks; census tracts with 40% or more Hispanic origins and less than 25% Black; and other census tracts. Within these three stratifications, households (addresses) were randomly selected for the screener survey with an oversampling in minority strata. The screener survey asked basic demographic characteristics to judge eligibility for the next step, PFI survey.

In the second stage, a child within the household was randomly selected for PFI, and the questionnaire was sent to a household to respond. Different children had different probabilities of being selected into the sample, requiring an appropriate computation of estimates and standard

errors by weights. NHES data suggests using Jackknife replication method for the sample estimations (McPhee, 2015).

In general, replication methods divide the total sample into multiple groups. Then, the method computes the survey estimates for each sub-group sample based on the created replicate weights reflecting the sample design in the full sample. The variations in those survey estimates can be used to estimate the standard error of the full sample’s estimation. The Jackknife replication method particularly splits the sample into 80 random subsamples (replicates) to calculate the replicate weights<sup>1</sup> (Wolter 1985). NCES already computed and included 80 replicates<sup>2</sup> and a final sample weight in the PFI dataset to assist data users with producing reliable estimates with efficient data processing cost (McPhee, 2015). Therefore, all statistical analyses in the dissertation will account for the final sample weight and/or replicate variables as necessary.

**Unit of Analysis.** Respondents were generally parents or guardians, but the target population of the survey is K-12 aged children. In other words, the unit of analysis is a child, meaning findings with the inferential statistics will represent K-12 children rather than parents. For example, a technically accurate interpretation would be “children with white parents were more likely than children with black parents to have parents who attend school meetings.”

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$$v(\hat{\theta}) = \frac{G-1}{G} \sum_{k=1}^G (\hat{\theta}_{(k)} - \hat{\theta})^2$$

<sup>1</sup> The above form is for Jackknife estimation.  $\Theta$  is the population parameter of interest;  $\hat{\Theta}$  is the estimate of  $\Theta$  based on the full sample;  $\hat{\Theta}^{(k)}$  is the estimate of  $\Theta$  based on the observations included in the kth replicate; and  $G$  is the total number of replicates

<sup>2</sup> “The 1st, 81st, 161st, 241st household, ... was assigned to group 1. The second household and every 80th household thereafter was assigned group number code=2, so that the 2nd, 82nd, 162nd, 242nd, ... household was assigned to that group. Each replicate, therefore, contained the household the count started with and every 80th household thereafter.” NHES 2012 Data User Manual

Though, studies with NHES data usually compared parents rather than children when discussing the results (DeAngelis, 2021; Milovanska-Farrington, 2022; Oberfield, 2020), likely for the simpler presentations and discussions. I adopt this approach for reporting the findings.

**Survey Year of Choice.** NHES has provided PFI data regularly since 1996, but this study only uses data from 2012, 2016 and 2019 for the following reasons. Foremost, NCES re-designed the survey in 2012, and the updated questions better serve the purpose of this research. Surveys before 2012 combined different types of parent engagement in the same question (e.g., “Have you volunteered at school or served on a school committee?”) The updated survey separates that into two questions, aligning with this study’s approach to differentiate between co-delivery and co-commissioning. Additionally, updated NHES surveys are more nationally representative than the data in previous years, because the sampling re-design expanded the coverage universally (McPhee, 2015). Sampling changed from Random-Digit-Dial (RDD) to Address-Based Sampling (ABS), changed the coverage from households with phones to households with any registered addresses.

I combine the above three cross-sectional data for the empirical examinations. NCES recommends analyzing datasets from different years separately rather than merging them. NCES makes this recommendation because each year’s data involves different sampling replication weights for adjusting complex sampling designs, and the surveys are independent cross-sectional surveys. But it is also methodologically possible to combine the datasets with complex sampling designs across different years, and the approach also has its benefits (Davis, 2007). First, the estimations will be more stable due to the larger sample. Second, the changes within subgroups of populations (i.e., increase in Hispanics in the U.S. population) will be reflected (Davis, 2007).

Thus, I combine NHES data from three years for the analyses to create extra 160 replicates for each year’s dataset for the accurate estimations (Davis, 2007).

**Sample Size.** Originally, the sample sizes for NHES-PFI data were 17,563 in 2012, 14,075 in 2016, and 16,446 in 2019 with response rates of 78.4%, 74.3%, and 84.0%, respectively. I drop children who attend private school or are home-schooled. This research focuses on coproduction between government agencies and service users in the provision of public services. Neither attending private school nor homeschooling fit in this category as private schools are not government entities, and homeschooling does not involve any public agencies to coproduce a child’s education.

Table 2. Sample Cleaning Process

	2012	2016	2019
Raw sample	17,560	14,080	16,450
Attending charter/private school or home-schooled	-2,500	-2,670	-3,100
Dropping parents of the other races	-460	-330	-470
Non-matching with Common Core Data	-30	-70	-110
		38,370	
Missing values with primary variables		-640	
Total sample size		37,730	

\*Source NHES 2012, 2016, and 2019

This study also excludes children who attend charter schools. While charter schools are legally part of the public-school system, they are not public agencies, but can be nonprofit or for-profit organizations that receive public funding to provide educational services. This distinction identifies charter schools as another coproducer with the governments to produce public education services and not themselves public agencies. Additionally, studies have shown charter



schools have much a different approach (Boylan, Petts, Renzulli, Domina, & Murray, 2021) and levels of parent involvement from traditional public schools (Bifulco & Ladd, 2006; Hamlin & Cheng, 2020; Oberfield, 2020). For these reasons, it is appropriate to analyze public schools separately from charter schools. I further exclude parents with other races for empirical analyses, which I will discuss more in detail in the variable section.

In the process of merging NHES data with Common Core Data (CCD) to include more detailed school characteristics like racial composition and school poverty level, I lost some observations which did not match with CCD. Finally, I dropped the cases that had missing values on some primary variables, such as parent's race, government initiatives, school satisfaction, and coproduction activities. For multivariate analyses, I also excluded the cases which had missing values on important control variables, such as school racial diversity, school poverty level, and enrollment size, leaving a total sample size of 37,730.

## **3.2. Variables**

### **3.2.1. *Dependent Variables***

Five different activities serve as dependent variables: four measures of coproduction at school and one measure of coproduction at home. All measures are binary. Coproduction at school has two co-delivery activities and two co-commissioning activities. Coproduction at home has one co-delivery activity.

**Definition of Co-Delivery and Co-Commissioning.** For the co-delivery measures, I adopt the traditional definition, co-provision of public services between governments and service users at the policy implementation stage (Levine & Fisher, 1984; Parks et al., 1981). Hence, the form of co-delivery is providing one's time and labor in the *production process* (Parks et al., 1981). For co-commissioning measures, I adopt the definition of coproduction activities that

prioritize services and resource allocations (Loeffler & Bovaird, 2019; Nabatchi et al., 2017). Thus, co-commissioning activities require the joint efforts between public officials and service users/citizens in *determining public services and corresponding resource allocation*, including *financing* (Nabatchi et al., 2017).

**Co-Delivery at School.** Co-delivery at school has two measures: attending parent-teacher conferences and volunteering. Attending parent-teacher conferences is coded 1 for parents who reported they attended a regularly scheduled parent-teacher conference with child's teacher, and 0 otherwise. Parent-teacher conferences are *one-to-one* activities between a child's teacher and a parent or guardian. In other words, parent-teacher conferences are coproduction activities at an individual level that aim to produce customized educational services for a certain child. These conferences become less common in middle and high school as children become more capable of managing their own schoolwork (Lewis, 2022).

The regularly arranged parent-teacher conferences usually occur twice a year, once in the fall and once in the spring (Lewis, 2022; Morin, 2022). In parent-teacher conferences, a parent and a teacher mainly discuss a child's academic progress, producing more effective educational support for the child (KidsHealth, 2022; Lewis, 2022; Morin, 2022). For instance, teachers would prepare a child's report cards, standardized test scores, assessment standards, and documents to discuss any behavioral issues (KidsHealth, 2022). Meanwhile, parents attend the conference, provides their time and information on a child, and work with teachers to produce more successful educational services for the child, which makes attendance at parent-teacher conferences participation in co-delivery.

Each conference commonly lasts about 10-20 minutes (Lewis, 2022; Morin, 2022). The length of the meeting probably requires less time than volunteering; however, parent-teacher

conferences probably demand certain levels of knowledge and language proficiency. In a such a short meeting, parents need to review the given materials and have an interactive conversation about the child's learning, which requires both a comprehensive knowledge on the academic routines of K-12 education, as well as fluent language skills.

The second measure is volunteering. The variable indicates the parent volunteered in the child's classroom or elsewhere at school (1: Yes). In K-12 education, parents have various volunteering opportunities at school. In a classroom, parents can assist teachers with preparing or conducting a class, especially in special classes, such as reading, sports, art, music, technology, and foreign languages (PTO Today, 2021; Slater Elementary, 2022). Parents can also give lectures on a career information day, teach in after-school programs, or offer tutoring (PTO Today, 2021; Slater Elementary, 2022). Outside of class, parents serve as chaperones on field trips, work at big school events or the school library, and maintain and design school homepages and newsletters (Molnar, 2019; PTO Today, 2021; Slater Elementary, 2022).

These different examples show that parents directly offer diverse inputs, such as time, labor, skills or even expertise, into the provision of educational service as they volunteer. Therefore, parents' volunteering offer a classic example of co-delivery (Pestoff, 2006). Also, volunteering likely demands a higher level of knowledge, language proficiency, and resources to coproduce than attending parent-teacher conferences. For instance, teaching in an afterschool program or being a chaperone for a field trip would ask parents to be familiar with the school administration, have expertise for the subject, teaching skills, social and language skills to conduct a class, and/or interact with school staff and students. Most importantly, both activities cost more time than attending parent-teacher conferences, which may only happen twice a year

for 10 to 20 minutes. Inherently, volunteering requires more skills and resources than attending parent-teacher conferences.

**Co-Commissioning at School.** I have two measures for co-commissioning at school: serving on school committees and attending PTO meetings. Although both serve as indicators for co-commissioning, the two activities are different in their participants. School committees are group coproduction involving only direct users of the public service, such as parents and teachers from affiliated schools, in the coproduction process. On the other hand, PTO meetings are forms of collective coproduction that usually also include community members and organizations in the process. Additionally, while affiliated with their own schools, PTOs are legally separate entities from the schools they support. Hence, serving on school committees and attending PTO meetings could present different results on their relationship to the determinants of coproduction.

The first variable, school committees, measures whether the parent or the guardian served on a school committee. I coded the parents who answered that they served on a school committee as 1, and the parents who responded they did not as 0. K-12 schools have multiple school committees as a result of previous education reforms. For the last few decades, the reforms have emphasized School-Based Decision-Making (SBDM) to provide education services that are more responsive to the users' needs (Barrera Osorio, 2009; L.-S. Wong, Coburn, & Kamel, 2020).

As a result of the reforms, most schools have curriculum committees, building and facility committees, parent advisory committees, and local school committees (school site council) (Barrera Osorio, 2009; GreatSchools, 2009; Scott, 2019). In other words, the existing school committees are the outcomes of policy reforms to involve parents in decision-making processes for public service provision, which shows that serving on school committees is co-commissioning.

The detailed roles of school committees, such as parent advisory committees and local school councils, further highlight how serving on school committees enables parents to participate in co-commissioning activities. Parent advisory committees produce educational priorities and goals for the school and identify parent and/or student needs (Denison School; Gouverneur Central School; Scott, 2019). Local school committees generally allocate resources by consulting on school budgets and setting program priorities (GreatSchools, 2009). In sum, serving on school committee requires parents to provide their inputs in prioritizing services or allocating resources, which establishes participation of parents on school committees or boards as a good example of co-commissioning (Nabatchi et al., 2017).

Serving on a school committee is probably the most demanding form of coproduction for parents, especially minority parents. Typically only a few users or citizens can participate in co-commissioning as user representatives (Loeffler & Bovaird, 2019), such as serving on a school committees. A school committee typically has 8 or fewer parents. Moreover, for some committees, like parent advisory committees or local school committees, often a parent must be selected by peer parents as a representative to serve on that committee, indicating that a parent needs to have a history of active involvement at the school to receive support for selection.

Additionally, being on school committees usually requires extensive knowledge, skills, and resources. For instance, parents serving on a facility committee need expertise in construction and maintenance, bidding processes, or building assessments (Scott, 2019). On the local school committees, parents need to have knowledge of budgeting, management, and school/education policy to serve, in addition to advanced levels of communication and language skills to interact with the principal, teachers, and other school staff on the subject matter.

The second variable, PTO meetings, measures whether the parent or the guardian attended PTA or PTO meetings. I coded the parents who answered that they attended those meetings as 1, and the parents who responded they did not as 0. Generally, both PTAs and PTOs are 501(c)(3) charitable organizations (Ian, 2021; Sullivan, 2022), and their membership includes not only parents and teachers, but also community members and organizations. Moreover, PTAs have state- and national-level chapters that have separate missions and goals from public schools by aiming to advocate and secure quality education for all children in the nation (National PTA; Sullivan, 2022).

These facts imply that PTAs and PTOs would have different dynamics from school committees when co-commissioning public education. PTAs' and PTOs' primary activities are to fundraise and financially support an affiliated schools' education programs, teachers, and infrastructure (GreatSchools, 2011; Ian, 2021),<sup>3</sup> which shows attending PTO meetings is a valid measure for co-commissioning, especially in terms of co-financing (Nabatchi et al., 2017).

Meeting minutes of PTO meetings (Oak Knoll PTO, 2021; South Arbor PTO, 2021) reveal the co-financing nature of those meetings. During PTO meetings, board members present fundraising results (e.g., money raised) and expenditures for the school, such as funding special events and education programs, providing appreciation gifts and grants for career development for teachers, purchasing learning materials, or updating school facilities. PTO meetings typically occur once per month and last for about an hour (Ian, 2021; PTO Answers, 2017). They are generally held in the evenings, allowing more flexibility for parents to attend than the other school activities.

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<sup>3</sup> I will refer to the variable as PTO meetings rather than PTA/PTO meetings in this discussion.

**Co-delivery at Home.** Parent involvement with learning at home is a commonly used measure in coproduction literature (Jakobsen 2013, Thomsen 2017, Anderson et al 2020). I measure coproduction at home with parent involvement with schoolwork: helping with homework. The measure was originally ordinal in the survey. I converted the variable into a dummy variable for two reasons. The interpretation and discussion of logit coefficients are more intuitive and easier than ordinal logit regression coefficients. Moreover, consistency with the measurement types of coproduction at school dependent variables is better to compare results. To ensure that this recoding approach does not distort the findings, I ran multiple logit and ordinal regressions with primary independent variable of interest, parent's race, to identify the breaking point for creating dummy variables. The analyses confirmed the re-coding would not change the findings or explanatory power of the model.

The dependent variables indicated parents' co-delivery at home. Helping with homework measures the weekly help a parent offers to a child. Parents who helped with a student's homework *at least once per week* are coded 1 (Yes). The original question for help with homework variable asked how often any adult in the household checks the homework completion of the child and the initial answers varied from never to 5 or more days a week. I re-coded parents who reported they check the child's homework at least once a week to 1, and parents who reported they do less than once a week or never to 0.

**Question Wording.** Survey questions used to measure coproduction both at school and home have a particular phrase in common. All questions asked whether "*Any adult in this child's household*" has done a certain coproduction activity [appendix A]. Because the questions asked about "anyone in the household" rather than "the parent," this could be slightly problematic in drawing conclusions about parents, but almost all respondents were parents or guardians.

Therefore, I believe it is safe to use the questions as measures for parents' coproduction. Additionally, I ran the regressions controlling for numbers of adults in the household as robustness checks. The findings showed it does not have any effects.

### ***3.2.2. Independent Variables***

**Race.** Race of parent, the primary independent variable of interest, consists of four dummy variables indicating White, Black, Hispanic, and Asian. Unless I specify in the discussion, White is the reference group for the study. In the data section, I discussed the initial unit of analysis of the survey: child. Thus, it might be more accurate to use child's race than parents' race. Nonetheless, following current literature that utilized NHES data (DeAngelis, 2021; Milovanska-Farrington, 2022; Oberfield, 2020), I use parent's race for the analyses for a couple of reasons.

First, the research question of the study is how a user's or citizen's race relates to their levels of coproduction as well as their capacities and resources to coproduce. Specifically, for the coproduction activities that I investigate in this study, a child is not the coproducer. The child is a beneficiary of education services that the school staff and parents coproduced. Also, it is the parent's race that determines the racial differences in abilities and resources to coproduce, not the child's race. Moreover, most parents and children share their race.



Table 3. Child Race over Parent Race and Year (%)

2012		Parent				
		White	Black	Hispanic	Asian	Others
Child	White	88	0 <sup>***</sup>	4 <sup>***</sup>	1 <sup>***</sup>	9 <sup>***</sup>
	Black	1 <sup>***</sup>	94	1 <sup>***</sup>	0 <sup>***</sup>	5 <sup>***</sup>
	Hispanic	6 <sup>***</sup>	2 <sup>***</sup>	93	2 <sup>***</sup>	8 <sup>***</sup>
	Asian	1 <sup>***</sup>	0 <sup>***</sup>	0 <sup>***</sup>	86	1 <sup>***</sup>
	Others	5 <sup>***</sup>	3 <sup>***</sup>	2 <sup>***</sup>	10 <sup>***</sup>	80
<i>Observations</i>		14,910				
*** $p < 0.001$ ; Source: NHES 2012						
2016		Parent				
		White	Black	Hispanic	Asian	Others
Child	White	88	1 <sup>***</sup>	3 <sup>***</sup>	2 <sup>***</sup>	10 <sup>***</sup>
	Black	1 <sup>***</sup>	93	1 <sup>***</sup>	0 <sup>***</sup>	14 <sup>***</sup>
	Hispanic	6 <sup>***</sup>	3 <sup>***</sup>	94	2 <sup>***</sup>	8 <sup>***</sup>
	Asian	1 <sup>***</sup>	0 <sup>***</sup>	0 <sup>***</sup>	87	1 <sup>***</sup>
	Others	5 <sup>***</sup>	3 <sup>***</sup>	2 <sup>***</sup>	10 <sup>***</sup>	68
<i>Observations</i>		11,130				
*** $p < 0.001$ ; Source: NHES 2016						
2019		Parent				
		White	Black	Hispanic	Asian	Others
Child	White	85	1 <sup>***</sup>	3 <sup>***</sup>	1 <sup>***</sup>	14 <sup>***</sup>
	Black	1 <sup>***</sup>	92	0 <sup>***</sup>	0 <sup>***</sup>	8 <sup>***</sup>
	Hispanic	7 <sup>***</sup>	4 <sup>***</sup>	96	4 <sup>***</sup>	12 <sup>***</sup>
	Asian	1 <sup>***</sup>	0 <sup>***</sup>	0 <sup>***</sup>	86	2 <sup>***</sup>
	Others	6 <sup>***</sup>	3 <sup>***</sup>	2 <sup>***</sup>	9 <sup>***</sup>	64
<i>Observations</i>		12,950				
*** $p < 0.001$ ; Source: NHES 2019						

The above tables indicate that most parents reported their child's race as the same as theirs, except parents of other races. In 2012, 2016, and 2019, 92-94% of Black parents and 93-96% of Hispanic parents reported having the same race as their child. In addition, 85-88% of White parents and 86-87% of Asian parents in reported to have a child with a same race. About 90% of White and Asian parents had children of the same race but about 10% of them had children of Hispanic or other races.

On the contrary, only 64-68% of parents of other races reported having a child of the same race in 2016 and 2019. Unlike White and Asian parents, they also did not have a specific race category to which their children usually belonged. Parents of Other race were the least likely to have a child of Asian race, but otherwise they did not differ in the proportion of having a White, Black, and Hispanic child. The larger variations might be due to smaller sample size of other races parents or higher likelihood of other races' parents to have multicultural families than the others since they tend to come from a multicultural family themselves.

In sum, the descriptive statistics show that parents generally share their race with their child in the survey, showing measuring race with the parent's race is acceptable except parents of other races. Thus, I exclude parents of other race from analyses. Also, in the next chapter on empirical findings, I provide regression models which examine racial disparities in coproduction with both the child' race as well as the parent's race to confirm that the two approaches do not vary meaningfully<sup>4</sup>.

**Abilities to Coproduce: Knowledge.** Knowledge can refer to either a comprehensive understanding of institutions or rules or specific information on coproduction (Alford, 2002; Levine & Fisher, 1984). For instance, parents can have general knowledge on the education system, but also can have specific information on how to effectively help with a child's math subject. In this study, I focus on the overall knowledge to coproduce rather than a particular element, as I am interested in parent's participation in the general coproduction activities rather than a specific kind, such as helping with ESL or special education children. This approach results in two measures for exploring knowledge to coproduce: education and immigrant status.

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<sup>4</sup> The findings showed there is not much difference between the models using child race and parent race, except for parents of other races, which again supports to exclude parents of other races from further analyses.

Parents' educational experience reflects one's knowledge of the learning process and educational institutions. For instance, parents who graduated high school would have more understanding on subject learning, school activities, useful approaches for the required academic and behavioral tasks than parents who did not attend or complete high school. Thus, parent's education can represent both general and issue-specific knowledge. Even though education is a valid and common measure for parent's knowledge for coproduction, this does not fully account for the necessary knowledge to coproduce. Participation in coproduction at school presumably demands an understanding of more than just relevant education issues. For example, parents need to know cultural norms and expectations of the education system and society in general to be able to interact appropriately with school staff or peer parents as a coproducer. Thus, I also include parent's immigration status as an indicator for knowledge.

I measure education with B.A. holder status. The measure is binary, coded 1 if the parent holds a B.A. degree and 0 if the parent does not hold the degree. I chose higher education degree status over an interval variable, like years of education, because both coproduction and parent involvement studies showed that higher education degree status consistently is a critical factor for parents to coproduce a child's education (Jakobsen & Andersen, Schneider, 2002, Wang & Fahey, 2011, Gee, 2011; Nzinga et al., 2009; Park & Holloway, 2013). I measure immigration status with U.S. born status. I coded parents who reported to be born in the U.S. as 1, and parents who reported to be born outside of U.S. as 0. Additionally, I coded parents who reported to be born outside of U.S. but born with U.S. citizenship as 1.

**Abilities to Coproduce: Language Skills.** Language proficiency is a three-level ordinal variable. The variable is coded as: 1: Parents whose first language is not English and still mostly speak Spanish or another language at home; 2: Parents whose first language is not English but

1: Parents who speak mostly English at home; 2: Parents whose first language is not English; 3: Parents whose first language is English. I use parents who mostly speak Spanish or another language as a reference group. This ordinal measure may not grasp the exact differences in the levels of language skills of parents, but it is valid enough to indicate the different levels of communication skills of parents to be involved in coproduction activities. For instance, Jakobsen (2013) measured parents' language skills to coproduce with two dummy variables indicating low and high Danish proficiency and found variations among the parents.

**Resources to Coproduce: Time and Income.** Time is an essential resource for coproduction. I use single parent status and number of siblings to estimate a parent's available time. Single parent status is a binary variable that codes single parents as 1. Single parents generally have less time than married parents, as they need to deal with tasks commonly shared by two parents. Also, the more children a family has, the less time a parent has available to spend on each child. Previous coproduction studies used number of siblings as a measure of available time for parents (Thomsen, 2017). I include the number of siblings of a child, an interval variable.

I use income to estimate one's financial resources, which the indicator coproduction literature has emphasized (Levine & Fisher, 1984; Parks et al., 1981; Warren et al., 1984). I have two measures: total household income and government assistance status.

Household income is a ten-level ordinal variable (1: '\$0 to \$10,000' 2: '\$10,001 to \$20,000' 3: '\$20,001 to \$30,000' 4: '\$30,001 to \$40,000' 5: '\$40,001 to \$50,000' 6: '\$50,001 to \$60,000' 7: '\$60,001 to \$75,000' 8: '\$75,001 to \$100,000' 9: '\$75,001 to \$100,000' 10: '\$150,001 or more'). This study will treat the variable as an interval variable in the analyses. Government assistance status represents whether the household receives any of following federal

government aid programs for *low-income families*: Temporary Assistance to Needy Families (TANF), food stamps, Medicaid, Children’s Health Insurance Program (CHIP), and section 8 housing programs. Using this recipient status variable signals significantly low-income status for the household. Since disparities in financial resources will be more apparent for low-income parents, this extra indicator might provide more additional explanations which the overall total household income measure could overlook.

**Experience with Government: School Satisfaction Index.** Coproduction studies have used satisfaction level as a measure for one’s experience with government (Alonso et al., 2019; Bovaird, Van Ryzin, Loeffler, & Parrado, 2015; Conway & Hachen, 2005; Uzochukwu & Thomas, 2018). Specifically, some studies used index measures to capture the multifaceted nature of satisfaction (Bovaird et al., 2015; Conway & Hachen, 2005). I also generalize an index variable to indicate the overall school satisfaction based on five questions. The five questions asked how satisfied or dissatisfied the parent is with the *school, teachers, academic standards, discipline, and staff-parent interactions*. The answers varied from ‘Very dissatisfied’ to ‘Very satisfied.’ Factor analysis confirmed the five questions construct one factor and the Cronbach’s Alpha was 0.89.

**Government Initiatives: Providing Information.** Studies found positive effects of providing information on how to coproduce (Jakobsen, 2013; A. L. Schneider, 1987), the importance of coproduction (Andersen et al 2020), and opportunities to coproduce (Marschall, 2004; Parrado, van Ryzin, Bovaird, & Löffler, 2013) Specifically, Jakobsen (2013) and Andersen et al (2020) studied the relationship between providing information and coproduction of education. Both used binary measures to understand the impacts of providing information on

how to help children with developing language at home (Jakobsen 2013) and information on the critical role of parents in a child's learning (Andersen et al 2020).

Following these studies, I operationalize two measures for the government initiatives on providing information: expected role and help with homework. Parents answered the questions on how well a child's school has been providing information on *parent's expected role at school* and about *how to help their child with homework*, respectively. Both measures were four-level ordinal variables (1: Does not do it at all 2: Not very well 3: Just okay 4: Very well). I use dummy variables to measure this variable, with "Does not do it at all" as a reference group.

**Government Initiatives: Lowering Language Barriers.** Government initiatives on supporting parents with limited language skills have two binary measures: providing translated written materials and interpreters. For translated written materials, I coded parents 1 if they answered the school offers translated written materials in the parent's native language, such as newsletters or school notices, and 0 otherwise. The interpreters variable indicates whether the school has interpreters who speak the parent's native language for meetings or parent-teacher conferences (1: Yes). The survey did not ask the questions for parents whose first language is English or who mostly speak English. In other words, the survey asked the questions only to parents who mainly speak Spanish or another language, shrinking the sample size for the relevant analyses to about 4,500.

### **3.2.3. Control Variables**

Control variables consist of the following categories: additional demographic characteristics of the parent; parent's educational aspirations; child characteristics; and school characteristics.

**Additional Demographic Factors.** As seen in the literature review, coproduction studies constantly examined gender and age as determinants. Thus, I control the gender and age of parents. For gender, I use a binary variable, female, in which female parents are coded as 1 and male parents as 0. Age is an interval variable, and I include a square term. Coproduction studies have confirmed the non-linear effect of age, with middle-aged people being most likely to coproduce (Alonso et al., 2019; Thijssen & Dooren, 2016).

**School Characteristics.** School characteristics, such as school size, student racial composition, and school poverty level, can impact parents' coproduction too. Schools with smaller enrollment sizes tend to have higher levels of parent involvement (Bhargava & Witherspoon, 2015; Bifulco & Ladd, 2006; Hamlin & Cheng, 2020). Some studies also found that lower portions of racial minority students (Bifulco & Ladd, 2006; Oberfield, 2020) or racial homogeneity (Paarlberg & Gen, 2009) positively impacted coproduction by parents at school. For school poverty, studies tend to examine the portion of free lunch program students (Bifulco & Ladd, 2006; Oberfield, 2020; Paarlberg & Gen, 2009), yet only one study found an association between the proportion of students in poverty and parents' participation in coproduction at schools (Bifulco & Ladd, 2006).

Additionally, enrollment sizes (Charbonneau & Van Ryzin, 2012), portion of racial minorities (Friedman, Bobrowski, & Markow, 2007), and portion of free lunch program students (Oberfield, 2020) significantly affected one of the study's primary independent variables, parents' school satisfaction. Therefore, I need to control school factors to prevent spurious effect of school satisfaction due to omitting antecedent variables.

For these reasons, I control school size, racial composition, and school poverty. Like previous studies, I measure school size with enrollment. The NHES data provides a five-level

ordinal variable on total school enrollment of students (1: Under 300; 2: Between 300 and 599; 3: Between 600 and 999; 4: Between 1,000 and 2,499; 5: Between 2,500 or more). I adopt this variable and use the ‘Under 300’ category as a reference group.

I have two measures for the student racial composition, portions of minority students and a racial diversity index since neither of the variables could explain the effect of racial composition solely. For these measures, I generate the variables from the merged CCD variables. Portion of minorities is an interval variable indicating the percentage of Black and Hispanic students at a school. For a racial diversity index, I calculate the racial concentration using the Herfindahl Hirschman Index approach as previous coproduction studies did (Bifulco & Ladd, 2006; Paarlberg & Gen, 2009) and multiply by 10 for more convenient discussion of the results. The index varies from 0 to 10, and the value 10 indicates complete racial heterogeneity.

For school poverty, I use a three-level ordinal variable indicating the portion of students in poverty. CCD datasets offer numbers of enrolled students and students qualified for reduced or free lunch programs. I generated a variable measuring proportions of reduced-free lunch program recipients based on the two ( $(\text{total students receiving reduced-free lunch programs} / \text{total enrolled students}) * 100$ ), then, I recoded the cases as three-ordinal measures (1: Below 25% 2: 25%-75% 3: Above 75%). I chose this ordinal measure as opposed to an interval indicator, because NCES, which collected both NHES data and CCD, provides and recommends this measurement.

Despite the common use of portions of reduced-free lunch program students as an indicator for school poverty, the gaps between the two values are wide (Snyder & Musu-Gillette, 2015). For instance, in 2012, more than a half of students in public school were eligible for free-lunch programs, but only 22% of the students were actually in poverty (Snyder & Musu-Gillette,



2015). Thus, NCES offered a couple of categorical measures for capturing the level of school poverty more accurately. NCES classified schools whose portions of free lunch program students are under 25% as low poverty schools and schools whose portions are above 75% as high poverty schools. This description might also explain why the previous studies that used the interval level measure found no effect of the portions of free-lunch program students on coproduction (Oberfield, 2020; Paarlberg & Gen, 2009).

**Educational Aspirations.** I control for one more parent characteristic that would represent a parent's educational aspiration since it can affect parents' willingness to participate in the coproduction process. For example, a parent who wants their child to attain a higher education degree might attend a parent-teacher conference more than a parent who anticipates their child only to complete high school. Thus, I control for a binary variable 'Expecting B.A. for child.' The variable indicates whether the parent expects the child to earn a B.A. degree or not, coding parents who expected their children to earn B.A. degrees or more as 1 and 0 otherwise.

**Child.** Child characteristics could affect the level of coproduction, too. Parent involvement studies found that the grade a child is attending affects parent engagement. In general, parents were more engaged at lower grades (Sebastian et al., 2017). Thus, I control for child's grade. The variable is a three-level ordinal variable (1: elementary 2: middle 3: high). Elementary school is the reference group.

A child's academic progress could affect a parent's coproduction at home, such as helping with or checking homework. For instance, children with low reading skills might need more assistance than children with average or high reading skills. Additionally, academic performance is the primary predictor of parents' satisfaction with school (Charbonneau & Van Ryzin, 2012; Milovanska-Farrington, 2022), one of the main independent variables. Hence, I

control a child's schoolwork for the relevant models. Schoolwork is a five-level ordinal variable measuring child's perceived schoolwork by parents (1: failing 2: below average 3: average 4: above average 5: excellent). I include the variable as a set of dummy variables, using 'failing' as a reference group. I also control whether child is enrolled for English as the Second Language (ESL) program or not (1: Yes), since children with the limited English skills might need more help with their schoolwork.

The survey had another question on child's academic performance which asked "Overall, across all subjects, what grades does this child get?" The answer had five categories, Mostly A's, Mostly B's, Mostly C's, Mostly D's or lower, and school does not give these grades. This question might be a more accurate measure than the perceived schoolwork variable for child's performance as it asks about an objective measure, grades. Yet, I use the schoolwork variable for a couple reasons. About 4,800 parents reported that school does not provide those types of grades, creating around 4,800 missing values and shrinking the sample size substantially. Also, about 92% of parents who answered had a child attending elementary school in the sample. Therefore, the perceived schoolwork is the only available measure for parents whose child attended elementary school.

Additionally, I will further control community characteristics, portion of minorities, portions of families in poverty, and community type (rural, town, suburb, urban) when it is necessary for robustness check.

### **3.3. Empirical Strategies**

The primary methodology will be logit regression as all five dependent variables are binary. I present the results with the average partial effects, using the margins command in STATA. This approach enables easier interpretations and discussions on racial differences in the

dependent variables than the raw logit coefficients. The original logit regressions will be available in the appendix for reference. All regressions utilize the final weight variable, which each survey provided, logit Y X [pweight=final weight].<sup>5</sup> On the other hand, all the descriptive statistics will use the svy: command to produce an accurate sample estimation with the Jackknife replication method that section 3.1 explained. Also, I run and present the descriptive analyses per survey year because estimating the sample mean from the merged three-year data can be biased due to the complex survey designs.

I have two empirical finding chapters. In chapter four, I examine the existences of racial disparities and the factors accounting for the disparities at the individual level, abilities, and resources to coproduce. I also examine whether adding control variables changes the results. In chapter five, I investigate the effects of government initiatives and satisfaction with government (school satisfaction) on coproduction. Then, I test whether the differences in parents' satisfaction with school explain the racial differences in coproduction and whether government initiatives alleviate the racial disparities in coproduction.

### ***3.3.1. Empirical Models for Chapter 4***

Chapter four investigates the racial disparities and the determinants of the disparities in coproduction. I start with a model with only one independent variable, race. The race coefficient will confirm the general racial differences in coproduction. The first model also compares the sizes of the race coefficients between co-delivery and co-commissioning. Then, from model 2 to 6, I add the various determinants of coproduction to test whether differences in those factors explain the racial gaps in coproduction. I include measures for abilities to coproduce, knowledge

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<sup>5</sup> The NHES data manual recommends using svy: commands with Jackknife replication method for the estimation. However, the study uses final weight with robust standard error estimation for two reasons. The chosen approach requires much less time for running analyses and enables to produce average partial effects. second, I found the differences in estimations between the two approaches are minimal.

(Model 2) and language proficiency (Model 3). Then, I add time and income (Model 4 and 5). Finally, I include control variables (Model 6, 7, and 8). As a result, the logit regressions would look like the following:

- (1)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \text{controls (age, gender, year)} + \varepsilon$
- (2)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_2 P1USborn + \beta_3 P1BA + \text{controls (age, gender, year)} + \varepsilon$
- (3)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_2 P1USborn + \beta_3 P1BA + \beta_4 P1Language + \text{controls (age, gender, year)} + \varepsilon$
- (4)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_2 P1USborn + \beta_3 P1BA + \beta_4 P1Language + \beta_5 P1Single + \beta_6 NumSib + \text{controls (age, gender, year)} + \varepsilon$
- (5)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_2 P1USborn + \beta_3 P1BA + \beta_4 P1Language + \beta_5 P1Single + \beta_6 NumSib + \beta_7 HHIncome + \beta_8 HHanyGov + \text{controls (age, gender, year)} + \varepsilon$
- (6)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_{2..n} (\text{knowledge, language, resources}) + \text{controls} + \text{school controls (racial diversity, \% of minority students, enrollment size, school poverty)} + \varepsilon$
- (7)  $CP^{\wedge} = \beta_0 + \beta_1 P1race + \beta_2 P1USborn + \beta_3 P1BA + \beta_4 P1Language + \beta_5 P1Single + \beta_6 NumSib + \beta_7 HHIncome + \beta_8 HHanyGov + \text{controls (age, gender, year, expected B.A. for child, attending grade, child's schoolwork, ESL program)} + \varepsilon$

Where the dependent variable is Coproduction (CP) at home and school. The basic control variables that I include for all models are age, gender, and survey year. The  $P1race$  coefficient  $\beta_1$  in model 1 provides the overall effect of race on each co-delivery or co-commissioning measures. I predict  $\beta_1$  to be negative as I predicted non-White parents are less likely to coproduce than White parents. I also expect the size of the coefficient  $\beta_1$  to decrease as adding the different independent variables from model 2 through 5.

For instance,  $\beta_1$  in model 2 now represents the direct effect of race after controlling the indirect effect of race through being U.S. born and having a bachelor's degree. Thus, the decrease in  $\beta_1$  from model 1 to model 2 would indicate that the observed overall racial differences in model 1 were partly due to the racial differences in U.S born and B.A. degree

status. With the same logic, I review the changes in the sizes of the  $\beta_1$  coefficients for the rest of the models, anticipating them to shrink or disappear. Model 3 adds parent’s language proficiency. Model 4 and model 5 include time and income; first, single parent status and number of siblings, then, household income and government assistance.

Models 6 and 7 sequentially control school characteristics, parent’s educational aspirations, and child characteristics. Model 6 adds school factor variables: the racial diversity index, portion of minority students, enrollment size, and low poverty school status to model 5. Model 7 includes child controls: parents’ expectation on child’s higher education degree, attending grade, schoolwork, and ESL program status.

Table 4. Testing Hypotheses in the Chapter 4

Model	Independent	Testing	
1	Race	H1 H2	White parents are more likely to coproduce than minority parents Racial differences will be larger for co-commissioning than for co-delivery
<i>Gradually adds measures for the following</i>			
2	Knowledge	H3	Differences in education and immigrant status help explain racial differences in co-delivery and co-commissioning
3	Language proficiency	H4	Differences in English proficiency help explain racial differences in co-delivery and co-commissioning
4	Non-financial resource: Time	H5	Differences in single parent status and number of siblings help explain racial differences in co-delivery and co-commissioning
5	Financial resources	H6	Differences in household income and government aid status help explain racial differences in co-delivery and co-commissioning
6	Controls		Controlling for school characteristics
7	Controls		Controlling for educational aspirations and child characteristics

### 3.3.2. Empirical Models for Chapter 5

**Chapter 5.** Chapter five investigates the effects of government initiatives on promoting coproduction and alleviating the racial gaps in coproduction. It also examines whether the racial differences in school satisfaction explain the racial differences in coproduction. I include the latter analysis in this chapter rather than chapter 4, since previous studies consistently found government initiatives substantially affect parents' satisfaction with school (Charbonneau & Van Ryzin, 2012; DeAngelis, 2021; Friedman et al., 2007; Milovanska-Farrington, 2022). The effect of school satisfaction should be examined after controlling government outreach efforts.

The first part of the chapter examines the effects of the government initiatives targeting parents in general, which provides information on coproduction. This part also tests the impact of school satisfaction. The second part investigates the government initiatives specifically aiming to facilitate coproduction of parents with language barriers through supports such as offering interpreters and translated written materials.

I start with model 7 and add the primary independent variable, government initiative, to test whether it has a positive effect on alleviating racial gaps in coproduction as I predict. In the following model, I add satisfaction with school to examine the effect of parent's school satisfaction on coproduction as well as whether racial differences in the variable explain the racial differences in coproduction. Finally, I run two sub-group analyses to observe the effects of government initiatives on alleviating the racial disparities in coproduction. As a result, the logit regressions would look like the following:

$$(8) \text{ CP}^{\wedge} = \beta_0 + \beta_1 \text{ P1race} + \beta_2 \text{ Info} + \beta_{3..n} (\text{knowledge, language, resources}) + \text{controls} + \varepsilon$$

$$(9) \text{ CP}^{\wedge} = \beta_0 + \beta_1 \text{ P1race} + \beta_2 \text{ Info} + \beta_3 \text{ SatIndex} + \beta_{4..n} (\text{knowledge, language, resources}) + \text{controls} + \varepsilon$$

$$(10) CP^{\wedge} = \beta_0 + \beta_1 P1_{\text{race}} + \beta_{2..n} (\text{knowledge, language, resources, satisfaction}) + \text{controls} + \varepsilon$$

if Info = 0

$$(11) CP^{\wedge} = \beta_0 + \beta_1 P1_{\text{race}} + \beta_{2..n} (\text{knowledge, language, resources, satisfaction}) + \text{controls} + \varepsilon$$

if info = 1

Model 8 adds a measure whether a school provides information on coproduction, and the coefficient of interest is  $\beta_2$ . I expect  $\beta_2$  to be positive, confirming that providing knowledge to coproduce promotes coproduction. The measure will be different for coproduction at home and school. For coproduction at school, I add a variable indicating provision of information on parents' expected roles at school. For coproduction at home, I add a variable measuring provision of information on how to help with homework.

Table 5. Testing Hypotheses in Chapter 5.1

Model	Independent	Testing	
<i>Gradually adds measures for following</i>			
8	Government initiative	H7A	Government initiatives to provide knowledge on how to coproduce increase co-delivery and co-commissioning
9	Experience with government	H6A	Satisfaction with school increases co-delivery and co-commissioning
		H6B	Differences in satisfaction with school can help explain racial differences in co-delivery and co-commissioning
Sub-group analyses			
10	Government initiative provided (Y)	H7B	Government initiatives providing knowledge to coproduce decrease racial differences in co-delivery and co-commissioning
11	Government initiative provided (N)		

After examining the effect of the initiatives on coproduction, I include a school satisfaction index in model 9. I expect  $\beta_3$  to be positive, confirming school satisfaction has a

positive effect on coproduction. I also compare the race coefficients  $\beta_1$  from model 8 and 9 to test whether the racial differences in school satisfaction explain the racial disparities in coproduction.

Finally, models 10 and 11 replicate model 9 for two sub-groups based on the information variable. Model 10 re-runs the model with parents who responded that the school does not provide information and model 11 is only for parents who responded school does provide information. I primarily review  $\beta_1$  from both models, predicting  $\beta_1$  in model 11 to be smaller than  $\beta_1$  in model 10. The following table summarizes the empirical models and testing hypotheses for the first part of chapter 5.

The second part of chapter five empirically tests the effects of government initiatives of providing interpreters and translated written materials assisting parents with limited language skills. Thus, I restrict the sample to parents whose first language is not English and still mostly speak Spanish or other language at home. The survey asked questions on providing interpreters and translated written materials only to those parents.

First, I examine the effects of the initiatives on coproduction. Then, I ran sub-group analyses for two groups, parents who had difficulty participating in school activities due to language and parents who did not, evaluating whether the arrangement increased the access to the coproduction process for parents in needs. The logit regressions would look like the following:

$$(12) \quad CP^{\wedge} = \beta_0 + \beta_1 \text{ Interpreter } + \beta_2 \text{ DiffiLang } + \beta_3 \text{ Info } + \text{ controls } + \varepsilon$$

$$(13) \quad CP^{\wedge} = \beta_0 + \beta_1 \text{ Interpreter } + \beta_3 \text{ Info } + \text{ controls } + \varepsilon \text{ if } \text{ DiffiLang=1 }$$

$$(14) \quad CP^{\wedge} = \beta_0 + \beta_1 \text{ Interpreter } + \beta_3 \text{ Info } + \text{ controls } + \varepsilon \text{ if } \text{ DiffiLang=0 }$$

In model 12 - 14, I examine the effects of providing interpreters at meetings. Unlike the previous examinations, I only look at three dependent variables: attending parent-teacher



conferences, attending PTO meetings, and serving on school committees. Because the questions for the measure asked whether the school has interpreters who speak the parent's native language for *meetings or parent-teacher conferences*, the practice of the providing interpreters will be apparent with the above three dependent variables. For this sub-chapter, I also adopt a new variable for language proficiency, DiffLang, which also measures the language barriers parents face to participate in coproduction. I also control Info variable since the general outreach of school is likely to be an antecedent variable for providing interpreters at school.

In model 12, the interpreter coefficient  $\beta_1$  is a coefficient of interest which I predict to be positive. Models 13 and 14 present sub-group analyses for parents who reported having difficulty participating in school activities due to the language barriers and parents who reported no difficulty. The primary coefficients of interests will be the  $\beta_1$  coefficients from both models. I compare the two coefficients, expecting  $\beta_1$  in model 13 will be bigger than  $\beta_1$  in model 14.

Control variables will include all independent and control variables in the previous analyses, such as knowledge to coproduce (education and immigration), time and income resources (single parent status, number of siblings, household income, government aid), educational aspirations (moved for current school and expect B.A. for child), child characteristics (attending grade and child schoolwork), school factors (racial diversity, % of minority, enrollment size, school poverty), basic demographics (race, age, gender, and year). Note that I excluded school satisfaction as I am interested in the overall effect of providing interpreters on coproduction rather than distinguishing the direct and the indirect effects.

In model 15-17, I re-estimate the above three models with a different government initiative, providing translated written materials.

$$(15) \quad CP^{\wedge} = \beta_0 + \beta_1 \underline{TransWritten} + \beta_2 DiffLang + \beta_3 NewsLetter + \text{controls} + \varepsilon$$

$$(16) \quad CP^{\wedge} = \beta_0 + \beta_1 \text{ TransWritten} + \beta_3 \text{ NewsLetter} + \text{controls} + \varepsilon \text{ if } \text{DiffiLang}=1$$

$$(17) \quad CP^{\wedge} = \beta_0 + \beta_1 \text{ TransWritten} + \beta_3 \text{ NewsLetter} + \text{controls} + \varepsilon \text{ if } \text{DiffiLang}=0$$

For the translated written materials, I examine both coproduction at home and school. I additionally examine coproduction at home: help with homework. Also, I control the overall government initiatives with a different measure, Newsletter instead of the Info variable. Newsletter indicates whether the school sent out newsletters or notices. The question for the translated written materials variable asked, “Does this child’s school have written materials, such as newsletters or school notices, that are translated into the parent’s native language?” The question does not limit the materials only to newsletters or notices, but as they are given examples, it would be more valid to control NewsLetter. Yet, for coproduction at home, I still control for providing information on how to help with homework.

Table 6. Testing Hypotheses in Chapter 5.2

Model	Independent	Testing
12 (15)	Government initiative	H8A Government initiatives to assist language barriers increase co-delivery and co-commissioning
Sub-group analyses		
13 (16)	Difficulty with language (Y)	H8B The government initiatives to assist language barriers increase co-delivery and co-commissioning, especially for parents with serious difficulties with language
14 (17)	Difficulty with language (N)	

In model 15,  $\beta_1$  represents the effect of providing translated materials in parents’ native language on coproduction at school and home. Models 16 and 17 replicate the sub-group analyses from model 13 and 14. Again, I predict  $\beta_1$  in model 16 will be bigger than  $\beta_1$  from model 17. The next tables summarize the hypothesis for each model test.

## **Chapter IV. Findings: Racial Disparities in Coproduction**

Current coproduction literature neglects the negative consequences of coproduction, especially with regards to equal access for and inclusion of racial minorities in coproduction. This chapter documents racial inequity in coproduction and whether/how racial disparities vary by coproduction activity at different policy cycles.

This chapter also examines how racial differences in ability to coproduce contribute to racial differences in coproduction. Revealing the structure and nature of administrative barriers that inhibit minority populations from participating in citizen-state interactions is a critical task of public management scholarship, in order to prevent or improve inequity or exclusion in the relevant activities (Jakobsen et al., 2019). In other words, understanding constructs of racial inequity in coproduction is as crucial as empirically documenting racial disparities in coproduction. Hence, this chapter empirically investigates the following: 1) racial differences in coproduction, 2) racial differences in abilities and resources to coproduce, and 3) the impact of racial differences on abilities and resources in coproduction. Before discussing the findings of the above examinations, I first review the summary statistics to understand the sample characteristics.

### **4.1. Descriptive Statistics**

Table 1 displays all summary statistics for 2012, 2016, and 2019. For the complex sampling-design surveys, calculating the mean from data by merging different years would be biased since each year has different weight variables for sample estimations. Hence, it is accurate to produce descriptive statistics per year. On the other hand, logit regression can use merged data since the regression can control for year (Davis, 2007). I produced the descriptive statistics with `svy: prefix` for running commands in STATA and with a survey setting `“svyset [pw=fwgt]`,

vce(jackknife) jkrw(fnwgt1-fnwgt160, multiplier(0.7895)) mse”, which the NHES data manual explicitly provided for sample estimations.

Table 7. Summary Statistics: Dependent Variables

	2012 (%)	2016 (%)	2019 (%)
<b>Co-delivery at school</b>			
Attended parent-teacher conferences	75	76	73
Volunteered at school	37	37	38
<b>Co-commissioning at school</b>			
Served on a school committee	11	11	10
Attended PTO meetings	44	45	45
<i>Observations</i>	14,460	10,790	12,480
<b>Co-delivery at home</b>			
Weekly help with homework	69	67	61
<i>Observations</i>	13,940	10,120	11,700

Source: NHES 2012, 2016, and 2019

On average, only around 10% of parents reported they served on a school committee. For the co-delivery activities at school, three-quarters of parents attended the regularly scheduled parent-teacher conferences with their child’s teacher. However, only about 40% of the parents volunteered in a classroom or at school. Parents were generally less likely to participate in co-commissioning than in co-delivery. Parents were more likely to attend PTO meetings than to serve on a school committee, but still only about 45% of the parents attended PTO meetings. Additionally, parents were also more likely to co-deliver at home than at school. In the sample, 62-69% of the parents helped with homework at least once per week.

The following table presents the summary statistics of the key independent variable, race, and some indicators for one’s abilities and resources to coproduce. The statistics in the table are percentages. For race, about 60% of the parents were White, 23% were Hispanic, 14% were Black, and 7% were Asians.

Table 8. Summary Statistics - Independent Variables

	2012 (%)	2016 (%)	2019 (%)
<u>Parent's race</u>			
White	58	57	57
Black	14	14	14
Hispanic	22	23	23
Asian	6	7	6
Born in U.S.	75	73	75
Holds B.A. degree	30	36	39
<u>English proficiency</u>			
Speaks English as the first language	76	74	73
Single parent	27	26	25
Receives government assistance	34	34	33
<i>Observations</i>	14,460	10,790	12,480

Source: NHES 2012, 2016, and 2019

Parents showed variations in their abilities to coproduce, indicated by knowledge (U.S.-born status and higher education status) and language proficiency. About three quarters of parents were born in the U.S., meaning the other quarter were immigrants and potentially facing more obstacles to coproduce. The disparity in education was larger. Only 30-40% of parents held a higher education degree. Finally, about three quarters of parents spoke English as their first language, while the other quarter either mostly spoke another language at home or mostly spoke English now.

Parents further differed in their resources to coproduce, such as time (single parent status and number of siblings) and financial resources (income and government aid). About a quarter of parents were single parents. One third of the parents reported receiving at least one form of federal aid for low-income families. Descriptive statistics of the other independent and control variables are available in the appendix.

## **4.2. Bivariate Regressions with Race**

I ran bivariate regressions with race as the only independent variable. First, I examine the total effects of race on various coproduction activities by testing the overall racial disparities in parents' co-delivery and co-commissioning. Next, I examine the racial differences in knowledge (U.S. born status and B.A. degree status), language skills, time (single parent status and number of siblings), and income (household income and government assistance status). This study expects that racial differences in abilities and resources to coproduce help explain racial gaps in coproduction. In other words, these measures are the intervening variables for the impact of race on coproduction. Hence, it is necessary to first confirm that the racial differences exist in those intervening variables before investigating whether they explain the racial gaps in coproduction.

Additionally, I refer to the regressions as bivariate regressions for the convenience of discussion, but they all use survey year as an additional control variable. Due to the complex survey-design, I must control the year variable for all analyses. Thus, each regression technically had one independent variable, race, and a control, survey year.

Racial minority parents tended to be less likely to co-deliver than White parents across different measures, supporting the first hypothesis. Black, Hispanic, and Asian parents were all less likely than White parents to volunteer at school. Hispanic and Asian parents were also less likely to attend parent-teacher conferences than White parents.

Table 9. Total Effect of Race on Coproduction

	At school				At home
	Co-delivery		Co-commissioning		Co-delivery
	Parent-teacher conferences	Volunteering	School committees	PTO meetings	Help with Homework
Black	-0.2 (-0.2)	-13.7*** (-11.3)	-4.3*** (-7.2)	12.4*** (9.5)	10.5*** (9.0)
Hispanic	-5.4*** (-5.8)	-16.0*** (-16.6)	-3.0*** (-4.5)	10.3*** (9.8)	7.0*** (7.4)
Asian	-4.1** (-2.8)	-8.7*** (-5.6)	-4.2*** (-5.2)	7.8*** (4.5)	0.7 (0.5)
Others	1.2 (0.7)	-0.1 (-0.0)	-2.5* (-2.3)	7.1** (2.7)	9.8*** (5.2)
2016	1.7* (2.2)	0.1 (0.2)	0.1 (0.3)	1.5 (1.6)	-2.5** (-2.9)
2019	-0.9 (-1.1)	0.7 (0.8)	-0.8 (-1.6)	1.3 (1.4)	-7.7*** (-9.2)
White in 2012 (constant)	74.8*** (231.3)	38.0*** (102.0)	10.4*** (46.7)	44.7*** (114.9)	66.2*** (186.1)
<i>Observations</i>	38,990	38,990	38,990	38,990	37,020

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

The racial disparities in co-delivery were bigger for volunteering than parent-teacher conferences. On average, 40% of White parents volunteered in a class or at school. Black, Hispanic, and Asian parents were 14, 16, and 9 percentage points, respectively, less likely than White parents to volunteer at school. In addition, Hispanic and Asian parents were 5 and 4 percentage points less likely than White parents to attend parent-teacher conferences (three-quarters of White parents attended).

Unlike co-delivery measures, the effects of race were inconsistent for co-commissioning variables, which partially supports the first hypothesis. Minority parents were substantially less

likely to co-commission in terms of serving on school committees. Generally, about 10% of White parents served on school committees. Both Black and Asian parents were 43 percent ( $4.3/10*100$ ) less likely to be on school committees. Hispanic parents were also 30 percent less likely than White parents to be on school committees.

In contrast, racial minority parents were more likely than White parents to attend PTO meetings. On average, 45% of White parents attended PTO meetings. Black and Hispanic parents were 12 and 10 percentage points more likely than White parents to do so. Asian and Other race parents were also 8 and 7 percentage points more likely than White parents to attend PTO meetings.

The racial differences in serving on a school committee were larger than the racial differences in parent-teacher conferences and volunteering, supporting the second hypothesis on the larger racial gaps in co-commissioning versus co-delivery. However, the magnitude of the racial disparities in volunteering were similar with the disparities in school committees for Black parents. Black parents were 37 percent ( $13.7/38*100$ ) less likely than White parents to volunteer at school while they were 43 percent less likely to serve on school committees.

The Hispanic-White gaps were smaller for school committees than volunteering. Hispanic parents were 42 percent less likely than White parents to volunteer, but they were 30 percent less likely to serve on school committees. These findings might be because volunteering at school usually demands a higher level of knowledge, skills, and time than attending parent-teacher conferences, and it might require abilities and resources similar to serving on school committees. Asian-White gaps however were much larger for serving on school committees (40 percent less likely) than volunteering (25 percent less likely).



Unlike coproduction at school, Black and Hispanic parents were more likely than White parents to coproduce at home, thus, rejecting the first hypothesis. Black and Hispanic parents were more likely to help with homework than White parents by 10 and 7 percentage points. On the other hand, Asian parents did not differ from White parents in helping with homework.

Results of the same regressions with child's race instead of parents' race resolve the concern of using parent's rather than child's race in the analyses except for 'other' race group. Therefore, further analyses exclude the group in analyses. [Appendix B].

I also ran multiple regressions to examine the racial differences in abilities and resources to coproduce. Except for the number of siblings, all the coefficients in the table below display proportion differences and are from logit regressions with margins command. The coefficients for the number of siblings are from a regression. Furthermore, I created and used a dummy variable for the total household income rather than running an ordered logit regression with a ten-level ordinal variable. The dummy variable measured whether the total household income at least matches the median household income of the sample. In other words, I coded observations 1 if their household income was over \$60,000. Overall, the findings showed racial minority parents had lower abilities and resources to coproduce than White parents. However, the main sources of the disparities varied by race.

About three quarters of White parents were born in U.S. and spoke English as their first language. More than one-third of White parents had college degrees and about a quarter of them were single parents. More than half of White parents earned as much as the median household income or more, and one third received government aid for low-income households.

Table 10. Overall Racial Differences in Abilities and Resources to Coproduce

	Knowledge		Language	Time		Income	
	U.S. born	B.A. holder	English First language	Single parent	Number of Siblings	Median household income or more	Government assistance
Black	-13.0*** (-11.6)	-16.3*** (-16.4)	-5.6*** (-6.4)	31.7*** (25.9)	0.1* (2.01)	-33.1*** (-43.5)	30.9*** (26.2)
Hispanic	-55.0*** (-57.0)	-27.0*** (-42.1)	-70.7*** (-89.5)	4.0*** (4.6)	0.3*** (10.3)	-31.7*** (-47.0)	24.8*** (25.5)
Asian	-83.1*** (-75.9)	14.5*** (8.1)	-77.3*** (-54.2)	-3.3 (-1.8)	-0.1 (-1.6)	-2.4 (-1.3)	-0.2 (-0.1)
2016	-0.8 (-1.1)	5.9*** (8.8)	-0.5 (-0.8)	-0.4 (-0.5)	0.0 (1.9)	4.8*** (10.2)	-0.0 (-0.1)
2019	1.3 (1.8)	8.7*** (14.0)	-1.1 (-1.8)	-1.3 (-1.7)	0.1** (2.9)	11.1*** (28.3)	-1.9* (-2.4)
Whites in 2012 (constant)	74.8*** (253.3)	34.5*** (128.2)	74.2*** (291.7)	26.3*** (79.0)	1.3*** (98.4)	53.7*** (289.6)	33.7*** (103.9)
<i>Observations</i>	37,730	37,730	37,730	37,730	37,730	37,730	37,730

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHE2012, 2016, and 2019

Black parents, on average, had less knowledge, time, and income than White parents. Black parents were only half as likely as White parents to have a college degree, 32 percentage points more likely to be a single parent, 33 percentage points less likely to have at least a median household income, and almost twice as likely to receive government aid for low-income families.

Hispanic parents generally had less knowledge, English proficiency, time, and income than White parents. The Hispanic-White gaps were especially substantial in language proficiency. Hispanic parents were 70 percentage points less likely to speak English as the first language; only 5 percent of Hispanic parents were native speakers; Hispanic parents were also 55 percentage points less likely than White parents to be born in the U.S. Moreover, Hispanic

parents had lower education levels and financial capabilities. They were 30 percentage points less likely than white parents to hold a higher education degree, 32 percentage points less likely to earn the median household income or more, and 25 percentage points more likely to receive government aid for the low-income families.

Asian parents overall had much less knowledge in terms of cultural experience and language skills than White parents. Asian parents were 83 percentage points less likely to have been born in the United States and 77 percentage points less likely to speak English as their first language. On the other hand, Asian parents were 15 percentage points more likely than White parents to be B.A. degree holders. Unlike Black and Hispanic parents, Asian parents did not experience disparities in time and income.

On average, minority students made up 37% of school enrollments, but schools varied from 4% to 70% [appendix C]. About a quarter of children in the dataset attended low poverty schools, while another quarter attended high poverty schools. Most children in the sample attended schools whose enrollment sizes are at least 600 or more.

School characteristics varied across racial groups. White parents dealt with less enrollment size, poverty, and racial diversity at schools. Bivariate logit regressions on school controls and coproduction confirmed the existing studies that, in general, enrollment size and school poverty had negative effects on coproduction [appendix D]. The bigger the enrollment, the less likely parents were to attend parent-teacher conferences, volunteer, and be part of school committees. The higher the school poverty level, the less likely parents were to attend parent-teacher conferences and volunteer at school. On the other hand, racial diversity and composition had no direct impact.

Table 11. School Characteristics by Race

	High poverty	Enrollment size under 600	Portions of minorities	Racial diversity
Black	32.1*** (25.5)	-4.1** (-3.1)	40.7*** (59.9)	0.7*** (13.4)
Hispanic	31.5*** (31.2)	-14.4*** (-13.9)	41.5*** (66.9)	0.4*** (7.6)
Asian	3.0** (2.6)	-14.7*** (-8.5)	9.7*** (12.1)	1.6*** (23.4)
2016	3.9*** (4.7)	-1.4 (-1.5)	1.5*** (3.0)	0.2*** (4.8)
2019	2.1** (2.8)	-0.2 (-0.2)	0.9 (2.0)	0.4*** (11.1)
White in 2012 (Constant)	7.5	41.0*** (104.5)	22.1*** (72.2)	3.8*** (133.5)
Observations	36,300	36,300	36,300	36,300

z statistics in parentheses

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012,2016, and 2019

In contrast, White parents were the least likely to send their children to high poverty schools (portion of free/reduced lunch program students > 75%) or racially diverse schools. Black and Hispanic parents were 32 percentage points more likely to send their child to a high-poverty school than White parents. The results of portions of minorities and racial diversity index showed White children were generally the least likely to attend racially heterogeneous schools (the higher the diversity index; the higher the racial heterogeneity). In sum, White parents were more likely to send their children to schools facing less challenges with implementing coproduction activities.

White children were more likely than racial minority children to attend small schools. For the enrollment size variable, I created a dummy (1: enrollment size under 600; 0: otherwise).

Hispanic and Asian children were 14 and 15 percentage points, respectively, less likely than White children to attend a small school; Black children were also 4 percentage points less likely than White children to attend small schools. Furthermore, Asian and Hispanic parents were more likely than White parents to send their children to schools with 1,000 or more students.

[appendix D].

Additionally, some child factors varied by race, too. Hispanic and Asian parents plausibly had higher motivation to coproduce; Hispanic and Asian parents overall had higher educational aspirations than White parents, as they were 7 and 21 percentage points, respectively, more likely to expect their child to earn a college degree [appendix D]. Hispanic children were less likely than White children to be above average with schoolwork, while Asian children were more likely.

#### **4.3. Determinants of Racial Differences in Coproduction**

Understanding what drives the racial gaps in coproduction is as pivotal as identifying racial disparities in coproduction. The knowledge will not only assist theory building in understanding the mechanisms of racial inequity in coproduction but also offer policy implications on how to improve the inequities. Therefore, this section examines whether the racial differences in knowledge, language skills, time, and income help explain the racial gaps in coproduction at school and home.

As presented in the empirical strategy section in the previous chapter, controlling for age, gender, and survey year in the first model, I will confirm the general effect of race on coproduction. Then, from the second to the seventh model, I gradually add the above intervening variables and observe whether the impacts of the race coefficients decrease or disappear. In the sixth and seventh model, I gradually add controls such school characteristics and child

characteristics including parent's expectation on the child's education. For discussions, I present only the coefficients of race to focus on understanding racial inequity in coproduction and its mechanism; however, full tables are available in the appendix.

#### ***4.3.1. Coproduction at School***

The discussion first addresses co-delivery at school: parent-teacher conference and volunteering. Then, I present results for co-commissioning: serving on school committees and attending PTO meetings. For each measure, I first discuss the general effects of race, and then I discuss how the racial gaps in the intervening variables explain racial gaps in the dependent variable. Additionally, I review how racial differences in controls further explain racial differences in the dependent variable when applicable.

**Co-delivery: Parent-Teacher Conferences.** Hispanic and Asian parents, but not Black parents, were overall less likely than White parents to co-deliver at school. The average participation rate for attending parent-teacher conferences was about 75 percent. Hispanic and Asian parents were 7 and 4 percentage points, respectively, less likely than White parents of the same age and gender to attend parent-teacher conferences. Black parents were no different from White parents for attending parent-teacher conferences. As predicted, abilities and resources had positive effects on one's probability to co-deliver in terms of attending parent-teacher conferences. Language proficiency and education status had substantial impacts on attending parent-teacher conferences [appendix E].

Table 12. Racial Disparities in Co-Delivery at School: Parent-Teacher Conferences

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-0.1 (-0.1)	1.5 (1.4)	1.3 (1.2)	1.9 (1.7)	1.7 (1.6)	2.4* (2.0)	2.6* (2.3)
Hispanic	-7.2*** (-7.5)	-3.0** (-2.9)	-0.8 (-0.6)	-0.6 (-0.5)	-0.6 (-0.6)	1.9 (1.6)	2.1 (1.8)
Asian	-3.8** (-2.8)	-2.2 (-1.4)	-1.6 (-1.0)	-1.2 (-0.7)	-1.2 (-0.7)	-0.5 (-0.3)	-1.3 (-0.8)
Year	Y	Y	Y	Y	Y	Y	Y
Age and gender	Y	Y	Y	Y	Y	Y	Y
US-born		Y	Y	Y	Y	Y	Y
B.A. holder		Y	Y	Y	Y	Y	Y
English proficiency			Y	Y	Y	Y	Y
Single parent				Y	Y	Y	Y
Number of siblings				Y	Y	Y	Y
Household income					Y	Y	Y
Government aid					Y	Y	Y
<u>Controls</u>							
School characteristics						Y	Y
Child characteristics							Y
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

The findings reveal both Hispanic and Asian parents were less likely to attend parent-teacher conferences than White parents, because they had less knowledge and language skills than White parents. Adding U.S. born status and college degree status decreased the size of the Hispanic coefficient by more than 50 percent (model 2). The difference then fully disappeared

after including language proficiency (model 3). In other words, Hispanic parents would be almost as likely as White parents to attend parent-teacher conferences if they had the same immigration status, education, and language skills. Yet, earlier findings showed Hispanic parents were significantly less likely than White parents to be U.S. born and a B.A. degree holder and speak fluent English, resulting in the observed Hispanic-White disparities.

The Asian-White difference disappeared after adding U.S. born status and education (model 2), which indicates Asians parents were less likely to attend parent-teacher conferences due to lower level of cultural experience and knowledge than whites (Asians parents showed higher education level than White parents, while they were substantially less likely to be born in U.S.).

Including controls variables did not change the results for Hispanic and Asian parents. On the contrary, Black parents became about 2 percentage points more likely than comparable White parents to attend parent-teacher conferences (model 6) if their children attended schools of same enrollment size, racial diversity, and school poverty. The sample characteristics demonstrated Black parents were more likely than White parents to send their children to schools with bigger enrollment sizes, higher racial diversity, and higher levels of school poverty, presumably leading them to be generally less likely and no more different than White parents to attend parent-teacher conferences.

**Co-Delivery: Volunteering at School.** Racial disparities in volunteering were substantially bigger than for parent-teacher conferences. On average, 37% of parents volunteered at school. Black, Hispanic, and Asian parents overall were 14, 17, and 9 percentage points less likely than comparable White parents to volunteer at school, respectively. All measures of knowledge, language proficiency, time, and income had positive effects on volunteering



[appendix E], while only knowledge and language proficiency affected parent-teacher conferences. Volunteering required more abilities and resources than parent-teacher conferences, potentially explaining the larger racial gaps in volunteering.

Specifically, higher education and English proficiency had sizeable positive impacts on parents' participation in volunteering. Cultural knowledge also mattered, as U.S. born parents were also more likely than comparable non-U.S. born parents to volunteer. Time and financial resources had positive effects as well. Single parents were less likely than comparable parents to volunteer; higher household income led to higher probabilities of volunteering; And government aid recipients were less likely to volunteer than comparable parents with no government aid.

Racial differences in abilities and resources accounted for racial gaps in volunteering. However, the primary attributes of the racial gaps varied by each racial group. The disparities in knowledge, time, and financial resources explained a little more than two-thirds of the differences between Black and White parents in volunteering. Adding indicators for knowledge to coproduce decreased the Black coefficient by 31 percent (model 2), indicating Black parents were less likely than White parents to volunteer at school partially because they were less likely than White parents to have a B.A. degree. Black-White gaps in time resources explained another one-third of Black-White gaps in volunteering.

Table 13. Racial Disparities in Co-Delivery at School: Volunteering

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-13.8*** (-11.3)	-9.7*** (-7.8)	-9.9*** (-8.2)	-7.1*** (-5.7)	-4.8*** (-3.7)	-3.3* (-2.3)	-3.7** (-2.8)
Hispanic	-16.5*** (-16.6)	-6.8*** (-5.4)	-3.3* (-2.3)	-2.6 (-1.8)	-1.7 (-1.2)	0.8 (0.5)	1.1 (0.8)
Asian	-9.3*** (-5.8)	-3.7 (-1.9)	-2.8 (-1.4)	-2.0 (-1.0)	-2.3 (-1.2)	-2.3 (-1.2)	-3.6* (-2.1)
Year	Y	Y	Y	Y	Y	Y	Y
Age and gender	Y	Y	Y	Y	Y	Y	Y
US-born		Y	Y	Y	Y	Y	Y
B.A. holder		Y	Y	Y	Y	Y	Y
English proficiency			Y	Y	Y	Y	Y
Single parent				Y	Y	Y	Y
Number of siblings				Y	Y	Y	Y
Household income					Y	Y	Y
Government aid					Y	Y	Y
<u>Controls</u>							
School characteristics						Y	Y
Child characteristics							Y
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Adding single parent status again shrank the Black coefficient by 30 percent (model 4), showing Black parents were less likely to volunteer at school than White parents partly because they were more likely to be single parents. Adding financial resources further decreased the size

of the Black coefficient by 2 percentage points (model 5), confirming Black parents were also less likely to volunteer than White parents due to their lower financial resources. Including controls variables decreased the Black coefficient decreased by 1.5 percentage points (model 6). Black parents were less likely to volunteer than White parents, also because they were less likely to send their children to smaller-sized and low-poverty schools. Even after controlling all the other variables, enrollment size and school poverty had negative impacts on the likelihood of volunteering [appendix E].

Hispanic-White gaps in abilities and resources fully explained their gaps in volunteering. In other words, Hispanic parents were less likely to volunteer than White parents partly because they had less knowledge, weaker language skills, and less time to coproduce. Particularly, the disparities in knowledge and language proficiency primarily explained the disparities in co-delivery, as they accounted for 80 percent  $((16.5-3.3/16.5) * 100)$  of the Hispanic-White differences in volunteering.

Adding the U.S. born status and B.A. degree holder variables shrank the Hispanic coefficient by almost half (model 2). Including language proficiency also decreased the size of the coefficient more than 50 percent (model 3). Next, the Hispanic-White difference fully disappeared after including time measures (model 4), which indicates Hispanic parents were less likely than White parents to volunteer also partially as they were more likely to be single parents. Including income (model 5) and control variables (model 6 and 7) did not change the Hispanic coefficient, leaving the White-Hispanic differences in volunteering fully explained by their differences in knowledge, English skills, and time.

The differences in knowledge and language skills also were the main attributes of the Asian-White disparities in volunteering. Adding U.S. born status and education shrank the Asian

coefficient by almost half (model 2). Asian parents were more likely to have higher education degrees but less likely to be born in the U.S. than White parents, which means Asian parents were less likely to volunteer at school than White parents, because they were less likely to be U.S. born. Although the Asian coefficient became statistically insignificant after adding knowledge, the size of z-statistics (1.9) indicates that Asian-White differences still area likely to exist in the population. This remaining half of the Asian-White difference in volunteering disappeared after adding language proficiency, meaning Asian parents were also less likely to volunteer at school than White parents as they were less likely to be fluent in English than White parents.

However, Asian parents became again less likely to co-deliver than comparable White parents by 4 percentage points after including child characteristics. This change indicates that Asian parents were less likely than White parents to volunteer at school *despite* the fact that they were significantly more likely than White parents to expect to send their children to universities. The full table presents that parents who expected their children to earn higher education degrees were 8 percentage points more likely than comparable parents to volunteer at school [appendix E]. Since Asian parents were generally 21 percentage points more likely than White parents to expect their children to earn college degrees, Asian parents should be more likely to co-deliver at school. Yet, they were less likely than White parents to volunteer at school, signaling extra hurdles potentially prevent Asian parents from co-delivering at school other than their lower cultural experience and language skills.

**Co-Commissioning: Serving on School Committees.** All racial minority parents were substantially less likely than White parents to co-commission at school. In general, 10 percent of parents served on school committees. Black and Asian parents were generally about 40 percent

(4.3/10\*100) less likely than White parents to serve on school committees, and Hispanic parents were also 30 percent less likely than White parents to serve on school committees.

Table 14. Racial Disparities in Co-Commissioning at School: School Committees

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-4.3*** (-7.1)	-2.8*** (-4.4)	-2.8*** (-4.6)	-1.9** (-2.8)	-1.1 (-1.6)	-1.8* (-2.3)	-1.8* (-2.3)
Hispanic	-2.7*** (-3.8)	1.2 (1.3)	2.5 (1.9)	2.7* (2.1)	3.1* (2.4)	2.7 (1.8)	2.7 (1.8)
Asian	-4.3*** (-5.2)	-2.5* (-2.4)	-1.8 (-1.6)	-1.4 (-1.2)	-1.6 (-1.4)	-1.6 (-1.4)	-1.7 (-1.5)
Year	Y	Y	Y	Y	Y	Y	Y
Age and gender	Y	Y	Y	Y	Y	Y	Y
US-born		Y	Y	Y	Y	Y	Y
B.A. holder		Y	Y	Y	Y	Y	Y
English proficiency			Y	Y	Y	Y	Y
Single parent				Y	Y	Y	Y
Number of siblings				Y	Y	Y	Y
Household income					Y	Y	Y
Government aid					Y	Y	Y
<u>Controls</u>							
School characteristics						Y	Y
Child characteristics							Y
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Education, English fluency, and single parent status had the largest impacts on the parents' probability of serving on a school committee [appendix E]. Even after controlling all other variables, parents with higher education degrees were 40 percent more likely to serve on school committees. The effect of English proficiency was also prominent. In contrast to the other coproduction measures, the advantage of language proficiency only existed for parents whose first language was English. The native English-speaking parents were 40 percent more likely than comparable parents who now spoke mostly Spanish or another language to serve on school committees.

Serving on a school committee also requires a greater time commitment. Single parents were 25 percent less likely to serve on a school committee than comparable co-parenting parents of equal education, language skills, income, and even school and child characteristics. Additionally, higher income also led to higher probabilities of serving on school committees [appendix E]. In brief, it seems that co-commissioning overall demands higher levels of education, English skills, and time than co-delivery as discussed in the literature review.

Black parents were less likely than White parents to serve on school committees fully because they had less education, time, and household income than White parents. The Black coefficient decreased by 50 percent after including B.A. degree holder status (model 2) and almost by 40 percent after adding single parent status and number of siblings (model 4). The Black-White difference completely disappeared after adding income measures (model 5). In other words, Black parents were less likely to co-commission at school than White parents because: 1) they were less likely to be a B.A. degree holder; 2) they were more likely to be a single parent; and 3) they had lower household income than White parents.

However, Black parents again became less likely than comparable White parents to serve on school committees by 2 percentage points after controlling for school characteristics (model 6). School's enrollment size and school poverty had negative impacts on the parents' probabilities of serving on school committees [appendix E]. Black parents were more likely than White parents to send their children to schools with bigger enrollment sizes and higher poverty, suggesting Black parents probably were less likely than White parents to serve on school committees due to these differences. In other words, Black parents would be as likely as comparable White parents to serve on school committees when their children attend schools with same enrollment size and poverty. Yet, Black parents were 2 percentage points less likely than comparable White parents to co-commission at school.

Hispanic parents were less likely to serve on school committees fully since they were less likely to be born in the U.S. and hold college degrees compared to White parents (model 1). However, after including language proficiency (model 3), the Hispanic coefficient became positive, even though the z-statistic (1.9) is still too small to be statistically significant at 0.05 level (1.96). This coefficient change indicates Hispanic parents were about 3 percentage points more likely to co-commission than White parents if they had the same level of language skills with White parents.

Adding time (model 4) and income (model 5) even further increased the Hispanic coefficient, demonstrating Hispanic parents were about 30 percent more likely than White parents to co-commission at school if they had the same time and financial resources as White parents. However, after adding school factors, Hispanic parents were no more likely than comparable White parents to serve on school committees (model 6), because they were substantially more likely to send their children to bigger-sized and high-poverty schools.

Asian parents were less likely than White parents to be on school committees despite their advantage of holding a higher education degree, because they were less likely to be U.S. born and to speak English as the first language than White parents. In model 2, the Asian coefficient decreased by half after adding U.S. born status and education. Asian parents were more likely than White parents to have a higher education degree, yet they were less likely to be born in the U.S., resulting in lower likelihood to access school committees. The differences in language proficiency fully explained the rest of the Asian-White disparities (model 3) and adding control variables did not change the result.

**Co-Commissioning: Attending PTO Meetings.** Black, Hispanic, and Asian parents were all more likely than comparable White parents to attend PTO meetings unlike serving on school committees. Overall, 45% of parents attended PTO or PTA meetings. Black, Hispanic, and Asian parents were, respectively, 13, 10, and 7 percentage points more likely than White parents to attend these meetings (model 1). This finding goes against the first hypothesis that White parents will be more likely than racial minority parents to co-commission. Also, among the various measures for abilities and resources to coproduce, only U.S. born status, education, and single parent status affected parents' attendance at PTO meetings.

Interestingly, language proficiency did not affect PTO meetings. Immigration status had the largest effect on attending PTO meetings. More importantly, the impact of U.S. born status was the opposite direction for PTO meetings. U.S. born parents overall were less likely than comparable non-U.S. born parents to attend PTO meetings by 7 percentage points [appendix E]. College education and time resources still positively affected the level of coproduction; however, the sizes of the impacts were only half as big as the effect of U.S. born status or less.



Table 15. Racial Disparities in Co-Commissioning at School: PTO/PTA Meetings

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	12.8*** (9.8)	12.5*** (9.4)	12.4*** (9.4)	13.4*** (10.0)	12.9*** (9.5)	10.5*** (7.1)	10.5*** (7.1)
Hispanic	9.7*** (8.9)	6.9*** (5.3)	6.5*** (4.3)	6.7*** (4.4)	6.5*** (4.3)	5.6*** (3.4)	5.7*** (3.5)
Asian	7.2*** (4.0)	1.3 (0.6)	0.6 (0.3)	1.1 (0.5)	1.1 (0.5)	0.7 (0.3)	-0.0 (-0.0)
Year	Y	Y	Y	Y	Y	Y	Y
Age and gender	Y	Y	Y	Y	Y	Y	Y
US-born		Y	Y	Y	Y	Y	Y
B.A. holder		Y	Y	Y	Y	Y	Y
English proficiency			Y	Y	Y	Y	Y
Single parent				Y	Y	Y	Y
Number of siblings				Y	Y	Y	Y
Household income					Y	Y	Y
Government aid					Y	Y	Y
<u>Controls</u>							
School characteristics						Y	Y
Child characteristics							Y
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Immigration status had the largest effect on attending PTO meetings. More importantly, the impact of U.S. born status was the opposite direction for PTO meetings. U.S. born parents overall were less likely than comparable non-U.S. born parents to attend PTO meetings by 7

percentage points [appendix E]. College education and time resources still positively affected the level of coproduction; however, the sizes of the impacts were only half as big as the effect of U.S. born status or less.

Complicating this examination, effects of U.S. born status, education, and time did not explain Black-White gaps in PTO meeting attendance. For instance, Black parents were more likely to attend PTO meetings despite their lower likelihoods of holding a higher education degree (model 2). Furthermore, a slight increase in the Black race coefficient in model 4 indicates that Black parents were more likely to attend PTO meetings even though they were more likely to be single.

In contrast, the differences in U.S. born status explained Hispanic-White and Asian-White gaps in PTO meetings. The Hispanic coefficient decreased by 30 percent by adding U.S. born status and education (model 2), showing Hispanic parents were partially more likely to attend PTO meetings than White parents even though they were less likely to be a B.A. holder as they were less likely than White parents to be born in the U.S. The differences in U.S. born status also completely explained the Asian-White differences in PTO meetings (model 2). The racial differences in abilities and resources to coproduce complicate our understanding on racial differences in PTO meetings rather than reveal the causes of the observed differences.

On the other hand, adding school control variables helped explain the Black-White and Hispanic-White gaps in PTO meeting participation to some degree. Racial diversity index and proportions of minority students positively affected PTO meetings [appendix E]. Specifically, while the proportion of minorities variable had null effects on the previous three dependent variables, the variable positively affected the parent's probability to attend PTO meetings. The sample statistics showed that schools which Black, Hispanic, and Asian children attended had

much bigger proportions of minority students than schools that White children attended by 41, 42, and 10 percentage points, respectively.

The results indicate that racial minority parents were more likely than White parents to attend PTO/PTA meetings, somewhat because they were more likely than White parents to send their children to schools with higher racial diversity and proportions of minority students. In fact, both the Black and Hispanic coefficients decreased by 2 and 1 percentage points, respectively, after including school factors (model 6).

#### ***4.3.2. Coproduction at Home***

In contrast to co-delivery at school, racial minority parents were generally more likely to co-deliver at home, disproving the first hypothesis.

**Co-Delivery: Help with Homework.** On average, more than two thirds of parents helped with homework at least once per week. Black and Hispanic parents were, respectively, 11 and 3 percentage points more likely to help with homework than White parents of the same age, gender, and year (model 1). Also, parents' education and language skills positively affected the likelihood of parents helping their child with homework, while single parent status and income had negative impacts [appendix E]. In contrast to co-delivery at school, income measures had negative effects on co-delivery at home.

None of the racial differences in knowledge, language skills, time, and financial resources helped explain the observed racial differences in helping with homework. Rather, the results show Black and Hispanic parents were more likely to co-deliver at home despite their disadvantages in education, language proficiency (only for Hispanics), and single parent status because their coefficient increased as variables were added.

Including income and school controls somewhat explained the racial gaps in co-delivery at home, though. The Black and Hispanic coefficients decreased after adding income measures (model 5), showing Black and Hispanic parents were more likely than White parents to help with homework, partly because they had lower income than White parents.

Table 16. Racial Disparities in Co-Delivery at Home: Help with Homework

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	10.2*** (8.9)	11.2*** (9.5)	11.1*** (9.4)	11.4*** (9.6)	10.1*** (8.2)	7.0*** (5.2)	7.0*** (5.7)
Hispanic	3.3*** (3.4)	5.7*** (5.0)	6.5*** (5.1)	6.6*** (5.2)	6.0*** (4.7)	5.4*** (4.0)	5.3*** (4.3)
Asian	1.3 (0.9)	3.0 (1.7)	2.9 (1.6)	3.0 (1.6)	3.1 (1.7)	3.2 (1.6)	2.0 (1.1)
Year	Y	Y	Y	Y	Y	Y	Y
Age and gender	Y	Y	Y	Y	Y	Y	Y
US-born		Y	Y	Y	Y	Y	Y
B.A. holder		Y	Y	Y	Y	Y	Y
English proficiency			Y	Y	Y	Y	Y
Single parent				Y	Y	Y	Y
Number of siblings				Y	Y	Y	Y
Household income					Y	Y	Y
Government aid					Y	Y	Y
<u>Controls</u>							
School characteristics						Y	Y
Child characteristics							Y
Observations	34,480	34,480	34,480	34,480	34,480	34,480	34,440

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

The coefficients further decreased after adding school controls (model 6), showing that Black and Hispanic parents were more likely to help with homework, partly because they were more likely to send their children to schools with higher racial diversity and with larger proportions of minority students than White parents. As racial diversity and the proportion of minorities increased, parents' probability of helping with homework increased [appendix E]. Surprisingly, racial differences in a child's performance with schoolwork or educational aspirations did not explain racial differences in helping with homework (model 7).

#### **4.4. Summary**

This chapter conducted empirical examinations to answer the following three primary research questions. 1) Do racial disparities exist in coproduction? 2) Do the disparities vary by type of coproduction? 3) What explains racial differences in coproduction? I predicted for each question that: 1) White parents will be more likely than racial minority parents to co-deliver and co-commission 2) racial inequity in co-commissioning will be bigger than co-delivery 3) racial gaps in knowledge, language skills, time, and income explain racial gaps in co-delivery and co-commissioning. In this section, I summarize and discuss the findings for these questions and predictions.

In short, this chapter offered important empirical evidence and understanding on racial equity in coproduction and improves upon insufficient scholarly work on verifying and resolving inequities in accessing coproduction for minority populations (Cepiku & Mastrodascio, 2021; Jakobsen, 2013; Jaspers & Steen, 2017).

These findings empirically documented overall racial inequities in terms of participating in co-delivery and co-commissioning activities at school but not in co-delivery at home. The following table presents the directions of the race coefficients after controlling for year, age, and

gender for each dependent variable, which displays most of the coproduction at school measures supported the first hypothesis on the higher likelihood of White parents to co-deliver and co-commission at school versus Black, Hispanic, and Asian parents.

Table 17. The Overall Racial Differences in Coproduction

	At school			At home	
	Co-delivery		Co-commissioning		Co-delivery
	Parent-teacher Conferences	Volunteering	School committees	PTO meetings	Help with homework
Black		-	-	+	+
Hispanic	-	-	-	+	+
Asian	-	-	-	+	
Support H1	Y	Y	Y	N	N

These results confirm theoretical arguments that a coproduction process is likely to provide unequal access to disadvantaged groups in society and exclude them from the process (Cepiku & Giordano, 2014; Honingh et al., 2018; Sharp & Rosentraub, 1981). Furthermore, the evidence on racial inequity in accessing coproduction complements previous studies that claimed either potential or prevalent negative impacts of coproduction on equity due to its limited access for minorities in terms of age, education, income, immigration status or even political resources (Eriksson, 2022; Eriksson et al., 2023; Jakobsen & Andersen, 2013; Leino & Puumala, 2021; Thomas & Streib, 2003; Thomsen, 2017).

On the other hand, the racial differences in co-delivery at home did not support the hypothesis as minority parents were more likely than White parents to help with homework at least once per week. Also, the findings on co-commissioning partially supported the hypothesis. Racial minority parents were more likely than White parents to attend PTO meetings, while they were less likely than White parents to serve on school committees.

These opposite findings between two co-commissioning measures could be due to their fundamental differences as organizations, such as legal status, nature or construct of activities, and missions. PTOs are legally registered nonprofit organizations, institutionally and financially independent organizations, unlike school committees which belong to a public school system. In other words, PTOs/PTAs have autonomy in decisions on core goals, target groups to serve, and whom to involve. In fact, PTOs and school committees are somewhat different in those aspects, which the literature review and data chapters also addressed.

Serving on school committees is group coproduction, since it involves only a few selected direct public service users in the co-commissioning process. This service primarily pursues local benefits by exclusively serving the affiliated school. On the other hand, PTOs and PTAs are collective coproduction that also engage community members and organizations as well as parents. They aim to attain common goods as well as local benefits. For instance, PTAs belong to state- and national chapters advocating a broader nationwide mission: quality education for all children in the nation. These differences might lead to different levels of minority parents' participation in school committees and PTO/PTA meetings.

A theoretical argument on the nature of nonprofit coproduction further provides insights. According to government failure theory, government failure to meet minority populations' public service needs leads service users and community to take collective action and establish nonprofit organizations to overcome the neglect (Lecy & Van Slyke, 2013; Paarlberg & Gen, 2009; Weisbrod, 1988). Several aspects of this chapter's findings support this explanation.

Racial minority parents faced significant unequal access to a school's main co-commissioning activities: school committees. The inequity and exclusion might make racial minority parents find their educational needs are not met by primary public service provision

processes; therefore, they would participate in PTO/PTA meetings to produce additional educational support or programs that can serve their needs. Also, measures which plausibly indicate the diverse needs had different impacts on PTO meetings from the other coproduction activities; immigrant parents were less likely to attend parent-teacher conferences, volunteer, and serve on school committees, but more likely to attend PTO meetings; racial diversity and percent of minority students had positive effects on PTO meetings, while it had only little or null effect on the other measures.

Additionally, the conflicting effects of the race between the two measures could be due to the different levels of inputs each co-commissioning activity requires. For instance, a school committee is a small meeting consisting of 6 to 8 parents and school staff and each meeting involves an in-depth discussion on school management issues. On the other hand, PTO meetings have a bigger attendance presumably since any parent or community member can attend. Additionally, PTO board members mainly set agenda, determine alternatives in advance, and lead the discussions although parents can present their opinions. PTO meetings are usually held once per month in the evening. Thus, attending PTO meetings, in general, would require less knowledge, language skills, and time.

Regardless, the contradictory effects of race on two co-commissioning measures calls for further examinations on what drives these differences and its implications for racial inequity in coproduction. Especially, whether the inconsistency is due to the different levels of coproduction (group vs. collective coproduction) or the initial unequal access to the main co-commissioning process, school committees, that excluded minority parents' service needs and perspectives.



This study also predicted that the racial gaps would be larger in co-commissioning than in co-delivery. The following table compares the coproduction activities that supported the first hypothesis: racial inequities exist in coproduction.

Table 18. Racial Disparities in Coproduction at School by Policy Cycle

H2	Racial differences will be larger for co-commissioning than for co-delivery	
	Parent-teacher conferences vs. school committees	Volunteering vs. school committees
Black	Y	Y
Hispanic	Y	
Asian	Y	Y

Overall, the racial gaps in both co-delivery activities, attending parent-teacher conferences and volunteering, were smaller than the racial gaps in co-commissioning: serving on school committees, which confirms the second hypothesis. Meanwhile, some dimensions of the findings either weakly supported or falsified the hypothesis.

Still, the fact that the findings generally displayed that racial inequities were worse in co-commissioning than in co-delivery provides important takeaways. The results reinforce the theoretical argument that it is more likely for co-commissioning to impede equity in accessing the coproduction process than the other coproduction activities (Bovaird & Loeffler, 2013). Also, confirming the second hypothesis enhances previous studies that found co-commissioning in health and urban policy contexts notably damaged essential public values, such as equity and inclusion by providing limited access for minority populations (Alexander, 2021; Eriksson, 2022; Eriksson et al., 2023; Leino & Puumala, 2021).

The identification of more severe racial inequity in co-commissioning than co-delivery also brings critical implications for public managers and policy practitioners. Racial inequities in

co-commissioning indicates a high chance of overlooking minorities' public service needs in education. The core of the co-commissioning process is joint efforts between public officials and clients/citizens for verifying what services to deliver, to whom, and what policy priorities/outcomes are the most urgent and desirable (Bovaird & Loeffler, 2013; Nabatchi et al., 2017).

Thus, inequity in co-commissioning is much more detrimental than inequities in coproduction at different policy cycles due to its consequences: excluding minorities' public service needs (Alexander, 2021; Bovaird & Loeffler, 2013; Eriksson, 2022). In this sense, the observed substantial racial inequities in serving on school committees indicate that racial minorities' educational needs would be neglected in the main public service provision process in school, which will reinforce current racial inequalities in educational outcomes.

The findings inconsistent with the predictions also offer some useful discussion. Although the results supported that Black-White racial gaps in co-commissioning were larger than in co-delivery, Black parents were less likely than White parents to volunteer almost as less as they were to serve on school committees; Black parents were 37 and 43 percent less likely than White parents to volunteer and serve on school committees, respectively. Besides, Hispanic-Whites gaps in volunteering was bigger than in serving on school committees, falsifying the hypothesis.

These results might be because volunteering at school usually demands a higher level of knowledge, skill, and time than attending parent-teacher conferences. In fact, the examinations showed only education and language proficiency affected parent-teacher conferences, while U.S. born status, education, language proficiency, single parent status, and income all impacted volunteering. Also, these determinants had much stronger impacts on volunteering than on

parent-teacher conferences, which suggests that volunteering may require as much input as serving on school committees does. In brief, the required types and level of inputs for the coproduction process might be as critical as the policy stage in constructing racial inequity in coproduction.

Additionally, Asian parents differed from Whites in co-commissioning to the same or worse degree than Black and Hispanic parents, even though they were more likely to share a similar socioeconomic status with White parents. Despite being highly educated, more affluent, and potentially having higher motivation to coproduce due to greater educational aspiration, Asian parents faced unequal access to the co-commissioning process. Moreover, they faced higher barriers to the co-commissioning process than Hispanic parents, who shared the common challenges, like cultural and language barriers, even though Asian parents had higher levels of education and income than Hispanic parents.

To provide more in-depth understanding on constructs of racial inequity in coproduction, the chapter further investigated what drives these observed racial inequities in coproduction by testing hypotheses 3 to 6. In this discussion, I focus on coproduction activities in which racial inequities existed, because the analyses aimed to reveal driving factors of racial disparities in coproduction to attain insights on how to improve the inequities.

Most coproduction activities at school supported the hypotheses on the contributing factors for the limited access to coproduction for racial minority parents. Specifically, the results of volunteering and school committees supported the hypotheses on all intervening variables: knowledge (U.S. born status and education); English proficiency; time; and income. On the other hand, the hypotheses only on knowledge and language skills explained the racial gaps in attending parent-teacher conferences.

Table 19. Empirical Findings for the Hypotheses on Racial Inequity in Coproduction

		Co-delivery		Co-commissioning
		Parent-teacher conferences	Volunteering	School committees
H3	Difference in education and immigrant status help explain racial differences in coproduction	Y	Y	Y
H4	Difference in English proficiency help explain racial differences in coproduction	Y	Y	Y
H5	Difference in single parent status and number of siblings help explain racial differences in coproduction		Y	Y
H6	Difference in income and government aid status help explain racial differences in coproduction		Y	Y

The contributing factor for the racial disparities varied by race though, meaning each racial minority parent group had different challenges to access the co-delivery and co-commissioning activities at school. Additionally, racial differences in school controls explained some racial gaps for Black and Hispanic parents.

Table 20. Determinants of the Racial Inequity in Coproduction by Race

	Coefficient	Sign	H3 Knowledge	H4 Language	H5 Time	H6 Income	School controls	Explained racial gaps (%)
<i>Co-delivery at school</i>								
Parent-teacher conferences	Hispanic	-	Y	Y				100
	Asian	-	Y					100
Volunteering	Black	-	Y		Y	Y	Y	70
	Hispanic	-	Y	Y	Y			100
	Asian	-	Y	Y				100
<i>Co-commissioning at school</i>								
School committees	Black	-	Y		Y	Y		60
	Hispanic	-	Y	Y			Y	100
	Asian	-	Y	Y				100

Black parents had less participation in co-delivery and co-commissioning at school than White parents, because they had less knowledge, time, and income. Particularly, Black parents' lower level of education and higher likelihood of being a single parent substantially limited their access to the coproduction processes explaining about 50 percent of Black-White racial gaps in volunteering and serving on school committees, respectively.

The Black-White differences in school controls regarding school size and poverty also slightly explained the gaps in volunteering. Black parents were less likely to volunteer than White parents, partially because they were less likely to send their children to smaller-sized and low-poverty schools. Yet, 30 percent of the Black-White disparities in co-delivery and 40% of the disparities in co-commissioning remained unexplained calling for further analyses what drove the racial inequity for Black parents. On the other hand, lack of knowledge due to being an immigrant and having low English proficiency completely explained racial inequities for Hispanic and Asian parents in accessing co-delivery and co-commissioning processes. For Hispanic parents, lower education level also prevented them from accessing coproduction.

Hispanic-White gaps in higher education experience, cultural experience, and language skills fully explained Hispanic-White gaps in parent-teacher conferences and serving on school committees. These gaps also explained 80 percent of the racial gaps in volunteering. Furthermore, the findings displayed that Hispanic parents were less likely to serve on school committees, since Hispanic children were more likely than White children to attend larger-sized and high poverty schools.

Asian parents were less likely than White parents to co-delivery and co-commission, because they were less likely than White parents to be US born and fluent in English. Notably, Asian parents were less likely to participate in volunteering than comparable White parents of

same immigration status and language skills *despite* their significantly higher educational aspirations.

These various dynamics of racial disparities in coproduction at school provide useful implications on understanding and resolving racial inequities in coproduction. Even though race affected various coproduction activities differently by policy cycle, the determinants of racial disparities were consistent across the diverse coproduction activities for each racial group. These findings signal that minorities will experience limited access to almost all types of coproduction activities due to their disadvantages, although the magnitude of the disparities might vary. The results support the dialogue that government should consider the dimensions of equity and inclusion in designing and implementing coproduction (Cepiku & Mastrodascio, 2021; Mary E Guy, 2021) and the theoretical argument that government should offer administrative support to alleviate the unequal access to coproduction for minorities (Sharp & Rosentraub, 1981).

Also, the fact that the main causes of the racial inequities varied by race presents the need for diverse approaches to improve racial inequities for different racial groups. Multiple factors, such as education, time, and income, limited Black parents' access to co-delivery and co-commissioning activities. Moreover, one-third or more of the disparities still remained unexplained, suggesting other types of unidentified barriers for Black parents to participate in coproduction. In contrast, knowledge and language proficiency primarily inhibited Hispanic and Asian parents to access coproduction. Therefore, government should consider both the varying and common challenges that racial minority parents face when designing initiatives to improve limited access.

For instance, all racial minority parents experienced limited access to coproduction due to having less knowledge to coproduce than White parents; therefore, government initiatives to

provide parents with information on coproduction should be a general approach. However, the initiatives should also consider the different nature of lacking knowledge for minority parents. For example, Black parents lacked knowledge to coproduce mainly due to their lower education level, but Asian parents did entirely due to being new to the country.

On the other hand, Hispanic parents had less knowledge because of both immigration status and education. Thus, schools should reflect these differences when identifying and offering necessary information to increase equity in coproduction effectively. Furthermore, it could be helpful for Black parents to have coproduction opportunities with less time or more flexible schedules while Hispanic and Asian parents would benefit from support for language barriers.

In the next chapter, I examine the effects of two types of government initiatives on increasing coproduction levels and improving racial disparities in coproduction: providing information and assisting with language skills.

## **Chapter V: Findings – Government Initiatives and Coproduction**

Government initiatives, the managerial arrangements to facilitate coproduction, are essential to improve unequal access to coproduction for minority populations, because the natural setting of the coproduction process will exclude them (Bovaird & Loeffler, 2013; Cepiku & Mastrodascio, 2021; Levine & Fisher, 1984; Sharp & Rosentraub, 1981). Moreover, government initiatives are necessary to secure the overall necessary levels of inputs from citizens/clients into the coproduction process.

Coproduction studies provide empirical evidence on government initiatives' effectiveness in promoting coproduction in general, which often has larger impacts on minorities. The current coproduction literature highlights the need for government to offer appropriate initiatives to facilitate overall coproduction and minorities' participation in coproduction. Understanding the pathways for racial disparities in coproduction provides valuable insights on gauging the government's administrative efforts to promote coproduction and alleviate the disparities in the process.

The previous chapter showed that all racial minority parents were less likely to coproduce at school than White parents, substantially because they had less knowledge to coproduce, such as higher education and cultural experience. Racial gaps in English proficiency also drove substantial racial gaps in coproduction for Hispanic and Asian parents. These results suggest effective government initiatives that provide parents with necessary information on coproduction and assistance with language barriers could also alleviate racial inequities in the coproduction process.

This chapter investigates whether those two types of government initiatives increase coproduction levels and shrink racial gaps. I first examine government initiatives that assist



parents' knowledge to coproduce: providing parents information on coproduction. Then, I investigate government initiatives supporting parents with language barriers. For both initiatives, the chapter primarily presents empirical analyses and discusses findings as follows: 1) The overall impact of government initiatives on coproduction and 2) The impact of government initiatives on improving racial inequities in coproduction.

When examining the effect of information provision, I additionally examine the effects that satisfaction with government has on coproduction and on explanation of the racial gaps in coproduction. Even though the earlier chapter reveals the mechanism of racial disparities, I investigate the satisfaction variable in this chapter, because school factors are the antecedent variables for the indicator.

### **5.1. Government Initiative: Providing Knowledge to Coproduce**

Providing information is the most common government approach in assisting citizens/clients with necessary knowledge to coproduce, which facilitates their participations in coproduction. For instance, coproduction studies have argued and found positive effects of providing information on: how to coproduce (Schneider 1987, Jakobsen 2013), the importance of participants' roles (Andersen, Nielsen, & Thomsen, 2020; Powers & Thompson, 1994; Thomsen & Jakobsen, 2015) Andersen et al 2020), and opportunities to coproduce (Marshall 2004, Parrado et al 2013). The previous chapter revealed that racial minority parents lacked knowledge to coproduce, therefore, initiatives that provide information on coproduction could also help minority parents access coproduction activities better. Hence, I investigate the impacts of providing information on coproduction and decreasing racial gaps in coproduction in this section. The section also includes additional analyses on the impacts of satisfaction with government. Before discussing findings, I first review the sample characteristics.

### 5.1.1. Sample Characteristics

#### Descriptive Statistics: School Information Provision and Satisfaction with School. I

operationalize two measures for the government initiatives to provide information on coproduction: expected role and help with homework. Parents answered the questions on how well a child's school has been providing information on *parent's expected role at school* and about *how to help their child with homework*, respectively. Both measures were four-level ordinal variables.

Table 21. Key Independent Variables: Providing Information and Satisfaction

	2012 (%)	2016 (%)	2019 (%)
<i>Government initiatives: School provides information on</i>			
<u>The expected roles at school</u>			
Does not do it all	12	12	12
Not very well	10	10	9
Just okay	36	34	36
Very well	42	43	43
<u>How to help with homework</u>			
Does not do it all	14	14	13
Not very well	12	13	12
Just okay	34	33	33
Very well	40	40	43
School satisfaction index	3.4 [SD=0.6]	3.4 [SD=0.6]	3.5 [SD=0.6]
<i>Observations</i>	13,820	10,700	11,780

Source: NHES 2012, 2016, and 2019

Most parents indicated that their schools provided them with information on their expected role at school; only about one-tenth reported the school does not provide any information on their expected roles at school. Levels of schools' information provision varied notably. 42-43% of the respondents answered that schools provide the information very well, while more than two-thirds reported schools' information provision is mediocre or worse.

Providing information on how to help with homework showed similar frequency distributions. On the other hand, the school satisfaction index did not vary much across the parents. The mean of satisfaction index was 3.4-3.5 with a standard variation of 0.6<sup>6</sup>

Table 22. Key Independent Variables by Race

	School provides information <i>very well</i>		Satisfaction index
	Expected roles at school	Help with homework	
Black	3.8** (2.7)	4.8*** (3.6)	-0.1*** (-6.5)
Hispanic	-5.4*** (-4.9)	-0.1 (-0.1)	-0.0 (-0.3)
Asian	-1.2 (-0.6)	0.8 (0.5)	0.0 (1.0)
2016	1.5 (1.6)	0.7 (0.7)	0.0 (0.9)
2019	1.7 (1.7)	2.8** (3.0)	0.0*** (4.2)
White in 2012 (constant)	42.8*** (105.9)	41.0*** (101.3)	3.4*** (429.3)
<i>Observations</i>	36,300	36,300	36,300

z statistics in parentheses  
 \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 Source: NHES 2012, 2016, and 2019

Schools' information provision statuses also varied by race. I created dummy variables indicating 1 that school provides information on parent's expected role at school very well and 0 otherwise (just okay, not very well, not at all); Then, I ran logit regressions and present the coefficients in percentage differences. Since all racial minority parents had less knowledge to coproduce than White parents, they ideally should receive sufficient information from schools.

<sup>6</sup> Satisfaction index used five questions to calculate the overall satisfaction with school, varying 1 to 4.

However, Hispanic parents were 5 percentage points less likely than White parents to send their children to schools that provide information on parents' expected roles very well. On the other hand, Black parents were more likely than White parents to attain a higher level of information provision on their expected role and how to help with homework by 4 and 5 percentage points, respectively. Asian parents did not show any difference from White parents.

Although Hispanic and Asian parents were less likely than White parents to receive an outstanding level of information from schools, proportion tests showed both were less likely than White parents to send their children to schools with none or incompetent information provision [appendix F]. On average, Latino and Asian parents were about a quarter less likely than White parents to report that the school does not provide information at all, but they were also, respectively, 5-9 and 6-7 percentage points more likely to report that schools provide information 'just okay' [appendix F]. In other words, Hispanic and Asian parents still had some support from schools in gaining information on coproduction; however, the support was rather mediocre or worse than competent.

### ***5.1.2. Findings***

**The Overall Effects of School Characteristics on Providing Information.** The findings on racial differences in control variables demonstrated racial minority children tend to attend schools with a higher need to assist parents to encourage their coproduction: schools with larger enrollments, higher-poverty, and more racial diversity. Thus, those schools should do a better job providing parents information on coproduction to support racial minority parents effectively. However, the empirical evidence proves the opposite. The next table presents the results of ordinal logistics regressions with margins command, presenting the coefficients in percentage points.

Although parents in larger, high-poverty, and more racial heterogeneous schools generally needed government initiatives the most, those schools were less likely to adequately offer parents the knowledge to coproduce. For instance, large, high-poverty, racially diverse schools were more likely not to provide any information on coproduction and less likely to provide the information very well.

Schools with over 600 students were more likely not to provide any information on coproduction than small schools, whose enrollment sizes were under 300. Specifically, parents at big schools, whose enrollment sizes were 1,000-2,499 or 2,500 and more, were, respectively, 7 and 9 percentage points more likely than parents at small schools that same year not to receive any information on their expected role at school. Parents at large schools were also 10 and 14 percentage points more likely than comparable parents at small schools to not receive information on how to help with homework at all.

Large schools also had lower performance levels in properly providing parents with information. Parents at large schools with enrollments of 1,000-2,499 or 2,500 and more were, respectively, about 16 and 18 percentage points less likely than comparable parents at small schools to report that school provided information on their expected roles very well. They also were 18 and 23 percentage points, respectively, less likely to report that a school competently provided information on how to help with homework.

Table 23. Effects of School Characteristics on Information Provision Status

	School provides information on	
	The expected role	How to help with homework
<i>Enrollment size (Reference: under 300)</i>		
<u>Between 300 and 599</u>		
Not at all	-0.2 (-0.4)	-0.4 (-0.6)
Not very well	-0.1 (-0.4)	-0.3 (-0.7)
Just okay	-0.2 (-0.4)	-0.4 (-0.7)
Very well	0.6 (0.4)	1.1 (0.7)
<u>Between 600 and 999</u>		
Not at all	1.6** (2.7)	1.5* (2.2)
Not very well	1.1** (2.7)	1.1* (2.1)
Just okay	1.6* (2.4)	1.1* (2.0)
Very well	-4.4** (-2.6)	-3.6* (-2.1)

Table 23. Effects of School Characteristics on Information Provision Status (continued)

Between 1,000 and 2,499

Not at all	7.3*** (10.8)	9.9*** (13.2)
Not very well	4.3*** (10.0)	5.6*** (11.4)
Just okay	4.0*** (6.3)	2.4*** (4.6)
Very well	-15.6*** (-9.3)	-18.0*** (-10.7)
<u>2,500 or more</u>		
Not at all	9.1*** (8.0)	14.0*** (11.4)
Not very well	5.1*** (8.7)	7.1*** (12.3)
Just okay	4.0*** (6.4)	1.4* (2.3)
Very well	-18.3*** (-8.8)	-22.6*** (-11.8)

Table 23. Effects of School Characteristics on Information Provision Status (continued)

*School poverty (Reference: low)*

Medium school poverty

Not at all	2.5*** (7.3)	3.3*** (9.0)
Not very well	1.6*** (7.1)	2.0*** (8.6)
Just okay	2.0*** (6.5)	1.6*** (7.5)
Very well	-6.1*** (-7.1)	-6.9*** (-8.7)

High school poverty

Not at all	2.4*** (3.8)	2.4*** (3.5)
Not very well	1.5*** (3.9)	1.5*** (3.6)
Just okay	1.9*** (4.2)	1.3*** (3.9)
Very well	-5.9*** (-4.0)	-5.2*** (-3.7)

*Racial diversity*

Not at all	-0.3*** (-4.0)	-0.3*** (-3.9)
Not very well	-0.2*** (-4.0)	-0.2*** (-3.9)
Just okay	-0.2*** (-4.0)	-0.1*** (-3.9)
Very well	0.7*** (4.0)	0.7*** (3.9)



Table 23. Effects of School Characteristics on Information Provision Status (continued)

<i>% of minority students</i>		
Not at all	0.0 (0.0)	-0.0* (-2.3)
Not very well	0.0 (0.0)	-0.0* (-2.3)
Just okay	0.0 (0.0)	-0.0* (-2.3)
Very well	-0.0 (-0.0)	0.0* (2.3)
<i>Under 300 in 2012</i>		
Not at all	9	12
Not very well	9	9
Just okay	33	30
Very well	49	48
<i>Low school poverty in 2012</i>		
Not at all	10	12
Not very well	8	11
Just okay	36	34
Very well	45	42
Observations	36,380	36,380

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Only year controlled

Source: NHES 2012, 2016, and 2019

The findings imply overall incompetencies of government initiatives in schools where the interventions presumably are the most needed to support their racial minority parents. The earlier chapter showed Hispanic and Asian parents, who significantly lack cultural and educational knowledge, were notably more likely than White parents to send children to bigger schools. Also, Black and Hispanic parents, who had much less education experience than White parents, were about four times more likely than White parents to send their children to high-

poverty schools. Hence, these results demonstrate that racial minority parents generally did not receive any or adequate support in increasing their knowledge to coproduce due to being at large and high poverty schools.

**The Overall Effects of Providing Information and Satisfaction on Coproduction.**

Only 10% of children attended schools that provided no information at all. In other words, parents in K-12 schools generally had help from schools to increase their knowledge to coproduce even though the magnitudes of the assistance were different. However, it is more critical that those government initiatives led to increases in coproduction. The following table presents simple regressions with only one independent variable providing information on the expected role at school.

Table 24. The Overall Effect of Providing Information on Coproduction at School

The expected role at school (Reference: Not at all)	Co-delivery		Co-commissioning	
	Parent-teacher conferences	Volunteering	School committees	PTO meetings
Not very well	5.4*** (3.5)	1.3 (0.9)	1.9* (2.2)	6.1*** (3.8)
Just okay	15.1*** (12.5)	11.3*** (10.0)	2.5*** (4.5)	13.3*** (10.6)
Very well	23.7*** (20.4)	23.1*** (20.6)	7.4*** (11.7)	21.4*** (17.5)
<i>Observations</i>	36,300	36,300	36,300	36,300

z statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Only year controlled

Source: NHES 2012, 2016, and 2019

In general, the better the school’s performance on providing information, the higher the co-delivery level. The impacts were especially large for volunteering. On average, 43% of parents volunteered at school. Parents at schools that informed parents of their expected roles ‘very well’

and ‘just okay’ were, respectively, 23 and 11 percentage points more likely to volunteer at school than parents at schools that provided none.

The effect was even bigger for co-commissioning, especially for school committees. overall participation rate for school committees and PTO meetings were 12% and 45%, respectively. Parents at schools that provided the information very well were two-thirds more likely to serve on school committees and 50 percent more likely to attend PTO meetings than parents at schools that provide no information at all. Even parents at schools with mediocre information provision were about one-sixth more likely to serve on school committees and one-third more likely to attend PTO meetings.

Table 25. The Overall Effect of Providing Information

	Co-delivery	
	Helped child with homework at least once per week	
Information on how to help with homework (Reference: Not at all)		
Not very well	15.9*** (10.6)	14.9*** (9.4)
Just okay	23.2*** (19.1)	20.9*** (15.0)
Very well	30.2*** (25.9)	26.8*** (18.4)
Information on the expected role at school (Reference: Not at all)		
Not very well		1.7 (1.1)
Just okay		3.5** (2.6)
Very well		5.4*** (3.7)
<i>Observations</i>	34,480	34,480

z statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Only year controlled

Source: NHES 2012, 2016, and 2019

Additionally, providing information on how to help with homework substantially increased parents' participation in co-delivery of homework help at home. Higher schools' performances on reaching parents with information led to larger probabilities of parents to help their children at home with homework. Even parents at schools that do not provide information on how to help with homework very well were 20 percentage points more likely than comparable parents at schools that provided none. The magnificent impacts of providing parents with information on how to assist child's learning at home indicates that the previous findings of no racial disparities in coproduction at home might be due to the strong effectiveness of the initiative.

**The Effects of Providing Information and Satisfaction with Government.** For more in-depth examinations of the effects of the government initiatives to increase parents' knowledge to coproduce, I conduct further analyses. As I presented in the empirical strategy section, I start with model 7, the last model in the previous chapter, which includes race, abilities (education, immigration status, and language proficiency) and resources (income, government aid, single parent status, and numbers of siblings), educational aspirations (expect child to earn B.A. degree), and the following control variables: child and school characteristics.

First, I include primary independent variables. Model 8 includes the providing information variable to confirm the impacts of government initiatives on coproduction, which examines whether racial disparities in coproduction change when White and racial minority parents were equally provided with information on coproduction. Model 9 adds the satisfaction index to investigate the effects of satisfaction with government on coproduction and to understand the racial gaps in coproduction.

The following tables present only the coefficients for primary independent variables, and the discussions focus on the key independent variables. The full tables with all controls' coefficients are available in the appendix.

**Table 26. Information Provision and Co-Delivery at School: Parent-Teacher Conferences**

	Model 7	Model 8	Model 9
Black	2.7* (2.3)	2.0 (1.7)	2.0 (1.7)
Hispanic	2.3 (1.9)	1.8 (1.5)	1.8 (1.5)
Asian	-1.5 (-0.9)	-1.7 (-1.1)	-1.8 (-1.1)
Not very well		3.2* (2.5)	3.2* (2.5)
Just okay		9.3*** (8.9)	9.4*** (8.7)
Very well		14.3*** (13.6)	14.5*** (12.6)
Satisfaction index			-0.2 (-0.4)
Controls			
Year	Y	Y	Y
Demographics	Y	Y	Y
Abilities and resources	Y	Y	Y
Educational aspirations	Y	Y	Y
Child characteristics	Y	Y	Y
School characteristics	Y	Y	Y
Community characteristics	Y	Y	Y
Observations	36,250	36,250	36,250

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

As a school did a better job at providing parents with information on their expected roles at school, the probabilities of parents attending parent-teaching conferences increased (model 8). Overall, about 75 percent of parents in the sample attended parent-teacher conferences. Parents at schools that offered knowledge on parents' expected roles 'very well' and 'just okay' were, respectively, 15 and 9 percentage points more likely to attend parent-teacher conferences than comparable parents at schools that did not offer any information. Providing information not very well only minimally increased participation.

Additionally, the positive impact of being Black disappeared after adding the information provision variables (model 8). The coefficient change shows Black parents were more likely than White parents to attend Parent-teacher conferences, because they were more likely to receive the proper information provisions from schools than White parents of same individual, child, and school characteristics. This result suggests providing information on the expected roles would improve unequal access to parent-teacher conferences for Black parents. School satisfaction did not have any effect on attending parent-teacher conferences (Model 9), and thus could not explain the racial gaps in the attendance [appendix H].

Government initiatives that provide information on parents' expected roles had positive effects on volunteering too (model 8). Overall, about 37 percent of parents volunteered at school. Parents at schools informing parents of the importance of their coproduction at school 'very well' and 'just okay' were, respectively, 15 and 9 percentage points more likely to volunteer than comparable parents at school offering no such information.

Table 27. Information Provision and Co-Delivery at School: Volunteering

	Model 7	Model 8	Model 9
Black	-4.4** (-3.2)	-5.0*** (-3.7)	-5.0*** (-3.7)
Hispanic	0.7 (0.5)	0.3 (0.2)	0.3 (0.2)
Asian	-4.1* (-2.3)	-4.3* (-2.4)	-4.2* (-2.4)
Not very well		2.5 (1.8)	2.5 (1.9)
Just okay		9.1*** (8.2)	9.0*** (8.0)
Very well		14.8*** (13.5)	14.6*** (12.1)
Satisfaction index			0.3 (0.4)
Controls			
Year	Y	Y	Y
Demographics	Y	Y	Y
Abilities and resources	Y	Y	Y
Educational aspirations	Y	Y	Y
Child characteristics	Y	Y	Y
School characteristics	Y	Y	Y
Community characteristics	Y	Y	Y
Observations	36,250	36,250	36,250

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Also, the racial gaps in volunteering slightly increased for Black and Asian parents (model 8), which demonstrates that providing information did not effectively narrow the racial gaps in co-delivery. Although Black and Asian parents were more likely than White parents to report a school provides the information just okay or very well, respectively, they were less likely to volunteer at school. There was no meaningful difference for parents at schools delivering the information poorly. School satisfaction did not have any impact on volunteering (Model 9) nor explained the racial gaps in volunteering [appendix H].

The impact of providing parents with information on their expected roles at school was even larger for co-commissioning. When schools provided information on parents' expected roles at school, parents' probabilities of serving on school committees significantly increased (model 8). On average, about 10 percent of parents in the sample served on school committees. Parents at schools that provided parents with information on the importance of their roles very well were 60 percent ( $6/10 \times 100$ ) more likely to serve on a school committee than comparable parents at schools that provided no such information at all (model 8). Even parents at schools which provided information badly or just okay were one-third more likely to serve on school committees.



Table 28. Information Provision and Co-Commissioning at School: School Committees

	Model 7	Model 8	Model 9
Black	-2.0*	-2.2**	-2.1**
	(-2.5)	(-2.8)	(-2.8)
Hispanic	2.5	2.4	2.4
	(1.7)	(1.6)	(1.6)
Asian	-1.8	-1.7	-1.6
	(-1.6)	(-1.5)	(-1.4)
Not very well		2.6**	2.7**
		(2.9)	(2.8)
Just okay		2.5***	2.5***
		(4.4)	(4.1)
Very well		6.1***	5.9***
		(9.8)	(8.5)
Satisfaction index			0.4
			(0.8)
Controls			
Year	Y	Y	Y
Demographics	Y	Y	Y
Abilities and resources	Y	Y	Y
Educational aspirations	Y	Y	Y
Child characteristics	Y	Y	Y
School characteristics	Y	Y	Y
Observations	36,250	36,250	36,250

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Again, providing information did not necessarily decrease the racial disparities in serving on school committees for Black parents, and school satisfaction did not have any effect on the school committee (Model 9) nor did it explain the racial differences in the variable.

When schools provided information on parents' expected roles at school, parents' probabilities of attending PTO/PTA meetings notably increased (model 8).

Table 29. Information Provision and Co-Commissioning at School: PTO/PTA Meetings

	Model 7	Model 8	Model 9
Black	9.9*** (6.6)	9.2*** (6.1)	9.2*** (6.1)
Hispanic	5.1** (3.2)	4.7** (3.0)	4.7** (3.0)
Asian	-0.2 (-0.1)	-0.4 (-0.2)	-0.5 (-0.2)
Not very well		5.2** (3.2)	5.1** (3.2)
Just okay		10.4*** (8.1)	10.5*** (8.1)
Very well		16.6*** (13.0)	16.8*** (12.3)
Satisfaction index			-0.3 (-0.3)
Controls			
Year	Y	Y	Y
Demographics	Y	Y	Y
Abilities and resources	Y	Y	Y
Educational aspirations	Y	Y	Y
Child characteristics	Y	Y	Y
School characteristics	Y	Y	Y
Community characteristics	Y	Y	Y
Observations	36,250	36,250	36,250

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

On average, about 45 percent of parents in the sample attended PTO meetings. Parents at schools that provided parents with information on the importance of their roles very well were 17 percentage points more likely to attend PTO meetings than comparable parents at schools that provided no such information at all (model 8). Even parents at schools which provided information poorly or just okay were one-fourth more likely to attend the meetings.

In contrast to serving on school committees, the coefficient changes in model 9 display that Black and Hispanic parent were more likely than White parents to attend PTO meetings partially because they were more likely to be at schools that provided information. In other words, providing information on the expected role seemed to promote minority parents' participation in PTO meetings unlike serving on school committees. Again, school satisfaction did not have any effect on the PTO meeting attendance (Model 9) nor any effect on explaining the racial differences in the meeting attendance [appendix H].

Providing information on coproduction also positively impacted coproduction at home. In general, 60-70% of parents helped their children with homework at least once per week. When a school informed parents how to help a child with homework either just okay or very well, parents' probabilities of helping with homework at least once per week increased by 11 and 12 percentage points, respectively. Even parents at schools that barely provided information on how to help with homework were about 8 percentage points more likely than comparable parents at schools that provided no information at all. Moreover, school satisfaction had a negative impact on coproduction at home (Model 9) but had no impact on coproduction at school. School satisfaction did not explain any racial differences in coproduction at home [appendix H].

Table 30. Information Provision and Co-Delivery at Home: Help with Homework

	Model 7	Model 8	Model 9
Black	6.7*** (5.4)	6.5*** (5.3)	6.4*** (5.2)
Hispanic	5.2*** (4.1)	4.7*** (3.8)	4.7*** (3.7)
Asian	2.0 (1.1)	2.0 (1.2)	1.7 (0.9)
Not very well		7.7*** (6.2)	7.9*** (6.3)
Just okay		10.6*** (9.9)	12.0*** (10.8)
Very well		11.9*** (11.1)	14.3*** (12.1)
Satisfaction index			-2.9*** (-4.6)
Controls			
Year	Y	Y	Y
Demographics	Y	Y	Y
Abilities and resources	Y	Y	Y
Educational aspirations	Y	Y	Y
Child characteristics	Y	Y	Y
School characteristics	Y	Y	Y
Community characteristics	Y	Y	Y
	34,500	34,500	34,500

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

In summary, providing parents with information on their expected roles at school increased parents' probabilities of co-delivering and co-commissioning at school even after

controlling for individual- and school- level determinants of coproduction behavior. For co-commissioning, even providing such information incompetently led to notable increases in parents' probabilities to participate in school committees. To provide parents with knowledge of how to help children with homework also promoted parents' coproduction at home in terms of helping their children with schoolwork at least once per week.

However, the impacts of the information provision on improving access to coproduction for minority parents were inconsistent. Seemingly, providing information on the expected roles at school improved the access to parent-teacher conferences and PTO meetings, but it did not do much for volunteering and serving on school committees. Since racial inequities were most prevalent in volunteering and serving on school committee, this result suggests the current government initiatives, providing information, presumably do not improve the disparities in coproduction in K-12 education effectively.

Also, satisfaction with government (school satisfaction) had no impact on most coproduction activities nor did it explain racial differences in coproduction. These results imply that omitting the antecedent variables, like government initiatives and school factors, caused satisfaction variable's spurious effects mainly due to excluding the government initiative variable [appendix H].

**Effects of Providing Knowledge to Coproduce on Improving Racial Disparities.** If assisting with knowledge to coproduce increases a parent's coproduction level, it should also facilitate coproduction especially by racial minority parents since they lacked such knowledge the most according to the previous chapter's findings. Hence, I re-ran model 10 by sub-groups to examine whether the observed positive effects of information provision also led to improving

racial disparities in coproduction. Since racial disparities existed in coproduction at school but not at home, I examine only coproduction at school variables.

For the analyses, I created a new dummy for indicating whether the school provides information on the expected role or not. I coded cases with ‘just okay’ and ‘very well’ as 1 and ‘not at all’ and ‘not very well’ as 0. If providing information improves the racial gaps in coproduction, the racial gaps in co-delivery and co-commissioning would be smaller among parents at schools that provided parents with information on their expected roles at school than among parents at schools that provided no information.

The findings present mixed results, but they generally show that providing information did not improve racial gaps in coproduction at school for both co-delivery and co-commissioning.

Table 31. Racial Disparities in Coproduction by Information Provision Status

Rerun model 9	Co-delivery				Co-commissioning	
	Parent-teacher conferences		Volunteering		School committee	
School provides information on the expected roles	No	Yes	No	Yes	No	Yes
Black	0.7 (0.3)	2.8* (2.2)	-3.8 (-1.7)	-4.7** (-2.9)	-1.5 (-1.4)	-2.1* (-2.3)
Hispanic	-1.3 (-0.4)	2.6* (2.0)	1.0 (0.4)	0.0 (0.0)	4.1 (1.5)	1.8 (1.1)
Asian	0.4 (0.1)	-2.0 (-1.1)	1.0 (0.3)	-5.1* (-2.4)	0.7 (0.3)	-2.4 (-2.0)
<i>Observations</i>	8,620	27,630	8,620	27,630	8,620	27,630

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

When schools provided information on the expected role of parents at school, Black and Hispanic parents were 3 percentage points more likely than comparable White parents to attend parent-teacher conferences. These differences are rather small, as 75% of parents attended parent-teacher conferences on average. The Black-White and Asian-White disparities in volunteering and school committees were even bigger among parents at schools which provided them with information on their expected roles than among parents at schools which did not. The results contradict this study's hypothesis that government initiatives offering knowledge to coproduce will contribute to alleviating racial inequities in coproduction. The findings also imply racial disparities in coproduction might be worse at schools that provide information on coproduction, especially for Black and Asian parents.

Extra examinations with another dummy (1: provides information very well; 0: otherwise) further support this implication. Black-White and Asian-White disparities were even bigger among parents at schools that provided knowledge on coproduction 'Very well,' again disproving the prediction that providing information well would decrease the racial disparities [appendix I]. Logistic regressions with the interaction terms (race\*information provision status) also support the above results [appendix J]. Schools' information provision on parents' expected roles improved the Hispanic-White gaps but not the Black/Asian-White gaps in coproduction at school, showing the current government initiatives are ineffective to promote coproduction by Black and Asian parents.

## **5.2. Government Initiatives: Assisting with Language Barriers**

Language proficiency is crucial to participate in coproduction (Levine & Fisher, 1984; Thomson, 2017). Limited language skills directly inhibit citizens/clients from participating in coproduction of public services. In fact, the previous chapter revealed that English proficiency

played pivotal roles for the diverse coproduction activities, and low English skills are the primary hurdles for Asian and Hispanic parents to coproduce. Hispanic and Asian parents were less likely than White parents to attend parent-teacher conferences, volunteer, and serve on school committees mainly because they had lower English proficiency than White parents. These findings demonstrate government's managerial efforts that encourage parents with language barriers to coproduce are necessary to improve racial inequities in coproduction, especially for Hispanic and Asian parents.

Currently, K-12 schools offer translated materials or interpreters to enhance inclusion in the coproduction process for those parents with insufficient language skills. Ideally, the arrangements will decrease the negative impacts of racial minorities on coproduction *through* their language barriers, presumably leading to decreasing the racial gaps in coproduction. Hence, if parents with language barriers are present, schools need to provide government initiatives that specifically promote coproduction by those parents. Also, to decrease racial disparities in coproduction, government initiatives should effectively increase coproduction levels especially for parents who faced the most difficulties due to language barriers.

Therefore, I present a general overview on schools' implementation of initiatives supporting language barriers. Then, I examine whether the current government initiatives had the intended impacts of promoting coproduction. Finally, I conducted sub-group analyses by the different levels of language barriers to investigate whether the government initiatives promoted coproduction for the parents in the most need. Before discussing the above, I will first describe the data since the examinations use a different sample. I also review sample characteristics regarding how parents with language barriers differ from parents without language barriers.



### 5.2.1. Data

The sample is much smaller than the earlier analyses. The survey only asked parents who mostly speak Spanish or other language the questions about government initiatives to assist parents with language barriers. In other words, the data excludes parents whose first language is English or parents who mostly speak English (even if their first language is not English), restricting the sample to about 4,800 cases.

I additionally dropped observations with missing values on the key independent variables, and about 70 cases whose measures on the existence of interpreters and translated materials were not reliable as parents from the same school in the same year reported differently. For the regression analyses, I further restricted the sample to Asian and Hispanic parents. As a result, the sample size is 4,660 for the descriptive statistics and 3,960 for the regression analyses.

**Independent Variables.** The empirical models have two main independent variables for measuring government initiatives: whether the school provided translated materials or an interpreter. Both variables were dummy variables. *Translated materials* was coded 1 if the parent responded Yes to the question, “Does the school have written materials that are translated into this person’s native language?” *Interpreter* was coded 1 if the parent responded Yes to the question, “Does the school have interpreters who speak this person’s native language for meetings or parent-teacher conferences?”

**Control Variables.** The control variables remained the same as in the earlier section: survey year, demographic factors, abilities and resources to coproduce, educational aspirations, and child/school/community characteristics. Also, the previous section’s main independent variable, general government initiatives (providing information), became an additional control variable. However, the analyses exclude school satisfaction as the examination is interested in

controlling the overall effect of general government initiatives rather than disaggregating the direct and indirect effects.

All the measures are the same as in the previous chapter except race and language proficiency. The additional new variable for race is Hispanic, coding Hispanic parents 1 and Asian parents 0. The previous language proficiency measure is no longer applicable as the sample is restricted to parents who mostly speak Spanish or the other languages at home. I adopted a new measure, language difficulty, a three-level ordinal variable, based on the question, “How difficult is it for this person to participate in activities at this child’s school because he/she speaks a language other than English?”

The original coding was as follows: 1 Very difficult; 2 Somewhat difficult.; 3 Very difficult. However, I treated the variable as a dummy and coded parents who responded very difficult or somewhat difficult as 1 and the parents who reported not difficult at all as 0. There was no difference between parents who said very difficult and somewhat difficult in coproduction levels [appendix M], and about 50% to 60% of the parents reported on average that they found participating in school activities either somewhat or very difficult due to their language barriers [appendix K].

### *5.2.2. Sample Characteristics*

**Parents with vs. without Language Barriers.** Parents in the restricted sample demonstrate somewhat different descriptive statistics from the previous data. The following two tables inform how parents with language barriers differ from the parents with no language barriers in the primary independent and control variables of the study (For a simpler discussion, I only present the results with 2012 survey, but the outputs with 2016 and 2019 also display much similar findings).

Parents with language barriers and no language barriers differ significantly in demographic, socioeconomic, child, and school characteristics. Most of the parents with language barriers were Hispanics (72%) and Asians (17%), respectively. The previous chapter's descriptive statistics showed 95% of White parents and 90% of Black parents spoke English as the first language, showing they do not face many language problems to engage in school activities. Also, findings confirmed the racial disparities in coproduction due to racial gaps in English skills mainly occurred for Hispanic and Asian parents. Thus, when examining the effects of government initiatives on coproduction, I focus on Hispanic and Asian parents.

Parents with language barriers had less knowledge to coproduce in terms of education and immigration status. These parents were 15 percentage points less likely than parents with no language barriers to hold higher education degrees and 80 percentage points less likely to be U.S. born. Moreover, they tended to have fewer financial resources, as they were 40 percent  $((52-31)/52*100)$  more likely than parents with competent English skills to receive government aid for low-income families. In contrast, minimal differences existed in single parent status and numbers of siblings, suggesting slight gaps between the two groups of parents regarding time. Furthermore, parents with language barriers are generally more likely to send their children to schools with higher portions of minorities, poverty levels, and school memberships: all of which increase obstacles to coproduction. In brief, parents with language barriers were hugely disadvantaged in access to the coproduction process regarding both individual and school characteristics. As a result, parents with limited language proficiency will be less likely to coproduce than parents with no language issues.

Table 32. Differences between Parents with vs. without Language Barriers

<i>2012</i>	Parents with Language barriers		Diff.
	Yes	No	
White	6.9	70.5	-63.6***
Black	4.9	16.9	-12.0***
Hispanic	71.6	10.1	61.4***
Asian	16.7	2.5	14.1***
B.A. degree	17.5	32.4	-14.9***
U.S. born	10.4	90.3	-79.9***
Government aid	51.7	30.9	20.8***
Single parent	24.2	27.8	-3.6*
Number of siblings	1.6	1.3	0.3***
Expect B.A.	79.0	64.0	15.0***
ESL enrolled	22.9	0.5	22.4***
<u>Attending grade</u>			
Elementary	51.2	48.5	2.7
Middle	22.9	22.4	0.5
High	25.9	29.2	-3.2*
Racial diversity	0.5	0.6	-0.1***
Portion of minorities	60.3	32.5	27.8***
High poverty school	31.6	14.9	16.8***
<u>Enrollment size</u>			
Under 300	3.7	8.3	-4.6***
Between 300 and 599	28.6	35.4	-6.8***
Between 600 and 999	36.3	30.6	5.7***
Between 1,000 and 2,499	26.1	23.2	2.9*
2,500 or more	5.3	2.5	2.7***
<i>Observations</i>	4,460	31,840	

Source: NHES 2012, 2016, and 2019

Table 33. Differences in Coproduction: Parents with vs. without Language Barriers.

		Parents with Language barriers		
<i>2012</i>		Yes	No	Diff.
Co-delivery	Parent teacher conferences	66	76	-10***
	Volunteering	20	41	-20***
Co-commissioning	Serving on school committees	6	12	-6***
<i>Observations</i>		4,460	31,840	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 Source: NHES 2012, 2016, and 2019

In fact, parents speaking mostly Spanish or other languages were less likely than others to coproduce at school. They were 10 percentage points less likely to attend parent-teacher conferences. Furthermore, they were only half as likely to volunteer and serve on school committees as parents whose first or primary language was English. Overall, parents with language barriers were notably less likely to coproduce at school, suggesting government initiatives that support parents with communication skills are necessary to decrease inequities in coproduction.

**Descriptive Statistics: Assistance for Language Barriers and Coproduction.** Ideally, all parents with language barriers should be able to benefit from government initiatives enhancing their participation in coproduction. Most of these parents (70% to 74%) reported that their school provided interpreters at school meetings, and 1 provides translated written materials in their native languages. Most schools have initiatives for parents with language barriers.

Still, about one-third of the parents said their schools did not make these outreach efforts. Schools provided translated materials or interpreters mainly for Hispanic parents, leaving Asian parents with the initial hurdles to coproduce due to language barriers. Hispanic parents generally were 55 and 54 percentage points, respectively, more likely than Asian parents to report school provided translated materials or interpreters [Appendix M].

Table 34. Descriptive Statistics: Government Initiatives Assisting Language Barriers

	2012 (%)	2016 (%)	2019 (%)
<u>School provides</u>			
Interpreters	69	74	74
Translated written materials	67	70	71
<i>Observations</i>		4,460	

Source: NHES 2012, 2016, and 2019

Furthermore, sub-group analyses showed that the unequal support to Hispanic and Asian parents would be even more problematic for the parents in the most needs with their language barriers. In 2012, about 60 of Hispanic parents and 40 percent of Asian parents reported they struggled with accessing coproduction activities at school due to speaking Spanish or languages other than English [appendix L]. 80 percent of those Hispanic parents identified that the school provided translated written materials and interpreters, but only 25% of Asian parents did. Also, 90 percent of those Hispanic parents were provided with interpreters, while only 36 percent of those Asian parents were. [appendix M]. Among parents facing the worst language barriers, Hispanic parents were 44 and 43 percentage points more likely than Asian parents to receive the administrative supports holding year constant [appendix M].

Table 35. Descriptive Statistics: Coproduction

		2012	2016	2019
Co-delivery	Parent teacher conferences	66	68	66
	Volunteering	20	22	22
Co-commissioning	Serving on school committees	6	8	8

Source: NHES 2012, 2016, and 2019

Parents with language barriers were the least likely to serve on school committees and the most likely to attend parent-teacher conferences. For co-delivery, about 70% of the parents

attended parent-teacher conferences, while only 20% volunteered at school. The low participation remained for co-commissioning activities. Only 6% to 8% of the parents with limited English served on school committees.

### 5.2.3. Findings

To improve the unequal access for parents with limited language proficiency, it is crucial for administrative support programs to be effective as well as available. Thus, I examine the impacts of providing interpreters and translated materials on coproduction. I further present the findings of sub-groups analyses on whether the initiatives increased coproduction for parents in the most needs. Tables provide results with the primary independent variable only.

Table 36. Effects of Providing Translated Written Materials on Coproduction

	Co-delivery		Co-commissioning
	Parent-teacher conferences	Volunteering	School committees
Translated materials	-1.3 (-0.4)	-4.8 (-1.3)	3.1* (2.2)
<i>Observations</i>	3,960	3,960	3,960

*z* statistics in parentheses  
 \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 Source: NHES 2012, 2016, and 2019

**Overall Impacts of Government Initiatives.** Providing translated written materials in one’s first language increased co-commissioning but not co-delivery, which partly supports the hypothesis. Parents who receive translated written materials in their first languages were 3 percentage points more likely than comparable parents with no such materials to serve on school committees. As the average participation rate of serving on school committees was 6%, this difference is huge.

Offering interpreters at school meetings also increased parents’ likelihood of participating in co-commissioning. Parents at schools that offered interpreters at school meetings were about two-thirds more likely to serve on school committees than comparable parents at schools that did not.

Table 37. Effects of Providing Interpreters on Coproduction<sup>7</sup>

	Co-delivery Parent-teacher conferences	Co-commissioning School committees
Interpreters	0.0 (0.0)	3.6** (3.0)
<i>Observations</i>	3,960	3,960

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

The significant impacts of the initiatives on serving on school committee is especially meaningful, because the gaps between parents with and without language barriers were the largest for serving on school committees, indicating the current government initiatives promote coproduction activity with the highest level of unequal inclusion. Also, better access to the school committees for parents with language barriers will alleviate the neglecting of minority students’ educational needs. Scholars warned unequal inclusions can be the most detrimental for co-commissioning activities (Bovaird & Loeffler, 2013, 2016; Loeffler, 2020), which produce policy priorities and resource allocations (Nabatchi et al., 2017), because unequal inclusions in co-commissioning leave minorities’ public service needs (Bovaird & Loeffler, 2013, 2016; Loeffler, 2020).

<sup>7</sup> Since the question wording specifically asked about meetings or parent-teacher conferences, the analyses excluded the volunteering variable.



### Differences in the Impacts of the Government Initiatives by Language Barrier.

Another way for the government initiatives to effectively increase access to coproduction for parents with limited language proficiency is to help those parents in the most need. Thus, the next analyses separately examine the effects of providing interpreters and translated materials on coproduction for two groups: parents who reported that it is somewhat or very difficult to engage in school activities due to speaking limited English and parents who reported it is not at all difficult to do so. If the current government initiatives helped the parents in the most need, the sizes of the effects of providing translated written materials and interpreters will be larger for the former than the latter.

Providing translated materials and interpreters did not have any impact on co-delivery for both groups of parents. The logistic regressions with interaction terms (providing translated materials\*difficulty due to language) showed the same results [appendix N]. In contrast, although only the impacts of interpreter were statistically significant, the effects of translated materials and interpreters on co-commissioning were bigger for parents in the most need.

Table 38. Effects on Government Initiatives by Level of Language Barriers

	Co-delivery				Co-commissioning	
	Parent-teacher conferences		Volunteering		School committees	
	<i>Have difficulty participating in school activities due to other languages than English</i>					
	No	Yes	No	Yes	No	Yes
Translated materials	1.0 (0.2)	-3.8 (-1.1)	-5.1 (-1.2)	-5.0 (-1.0)	2.8 (1.8)	3.1 (1.2)
Interpreters	3.7 (1.0)	-2.0 (-0.6)	-	-	2.4 (1.8)	4.3* (2.0)
<i>Observations</i>	2,060	1,900	2,060	1,900	2,060	1,900

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

The impact of providing interpreters on school committees was twice as large for parents who reported facing difficulties participating in school activities due to their limited English skills than for parents who identified no difficulties. Among comparable parents facing no difficulties engaging in coproduction due to language skills, having interpreters at meetings increased the probabilities of parents to serve on school committees by 2 percentage points, while the probabilities increased by 4 percentage points among comparable parents facing difficulties participating in school activities due to language skills.

The logit regressions with the interaction terms (providing interpreters\*difficulty due to language) support the findings above. The effect of providing interpreters was larger for parents who identified challenges in accessing coproduction activities due to speaking other languages than for parents who identified no challenges [appendix N]. However, the interaction term's coefficient is not statistically meaningful, suggesting the government initiatives might have the same effect for the two groups.

The inconsistent findings on the effects of two government initiatives may be due to the different nature of assistance. The translated written materials essentially help parents attain information on coproduction, such as coproduction opportunities or how to coproduce at home and school. Yet, the translated materials do not necessarily increase parents' abilities to participate in coproduction activities that require on-going communication. On the other hand, the presence of interpreters not only enables parents to gain information but also directly increases parents' abilities to engage in meetings.

These findings imply effective government initiatives should assist parents speaking insufficient English with assistance or equipment that enables them to participate in the

occurring coproduction process as well as providing them information on coproduction in one’s native language.

**Differences in Access to the Government Initiatives by Race.** Although the main interest of the study was to examine whether the initiatives were more effective for the parents most in need, descriptive statistics and bivariate regressions revealed that Hispanic parents were significantly more likely than Asian parents to have available government initiatives, which helps parents with language barriers so that they can have a greater access to coproduction.

In other words, racial gaps existed in accessing administrative assistance between Hispanic and Asian parents, possibly resulting in racial gaps participations in coproduction. Since providing help with language skills particularly impacted probabilities of participating in coproduction at the decision-making process, the inequity could be detrimental, continuedly neglecting Asian parents in determining public service needs and qualities.

Table 39. Inequity in Government Initiatives Provision in Co-Commissioning

	Translated materials				Interpreters			
	School committees		PTO meetings		School committees		PTO meetings	
Hispanic	2.3*	0.8	9.0**	7.2	2.3*	0.8	9.0**	7.8
	(2.0)	(0.5)	(2.7)	(1.6)	(2.0)	(0.5)	(2.7)	(1.9)
Translated materials		3.1*		3.2				
		(2.3)		(0.8)				
Interpreters						3.0*		2.2
						(2.4)		(0.6)
<i>Observations</i>	3,960	3,960	3,960	3,960	3,960	3,960	3,960	3,960

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

\*Only year controlled.

Source: NHES 2012, 2016, and 2019

In fact, Hispanic parents with language barriers were overall more likely than Asian parents with language barriers to co-commission at schools; they were 30 percent ( $2/6*100$ ) and about 50 percent ( $9/20*$ ), respectively, more likely to serve on school committees and attend PTO meetings than Asian parents. After adding the government initiative variables, the effects of the Hispanic coefficients completely disappeared; Hispanic parents were more likely than Asian parents to co-commission at school, because they were significantly more likely to have access to assistance with their language barriers than Asian parents. In other words, current government initiatives improved overall racial inequities mainly for Hispanic parents and constantly prevented Asian parents from coproducing at the decision-making stage, even though both Hispanic and Asian mostly parents experience unequal access to the coproduction process primarily due to insufficient language skills.

### **5.3. Summary**

The main goal of this chapter was to answer the fourth research question: do government initiatives to promote coproduction alleviate racial inequities in accessing coproduction? Thus, the chapter investigated the general presence and effects of government initiatives on the various coproduction activities, and then it further examined whether the initiatives also improved racial inequities regarding unequal access to coproduction. Specifically, the examinations focused on government initiatives to increase one's knowledge to coproduce and assist language barriers, since the previous chapter found that disparities in knowledge and language skills were the core attributes of racial disparities in coproduction.

Most schools offered a certain level of information, as only around one-tenth of the parents reported that schools did not provide information on their expected roles at school or how to help with homework. Providing the information, either just okay or very well, promoted

parents' co-delivery both at school and home, moreover, the information provision noticeably facilitated co-commissioning at school. The effect was especially the largest for serving on school committees, which showed the most serious racial inequities. In short, government initiatives offering knowledge to coproduce commonly increased coproduction level, which suggests the initiatives would also alleviate the racial gaps in coproduction.

However, the further examinations presented insufficient evidence on this prediction. Even when parents were equally informed on coproduction, racial minority parents faced unequal access to volunteering and school committees; Black and Asian parents were still less likely to volunteer, and Black parents were also less likely to serve on school committees than comparable White. Sub-group analyses also presented that racial disparities did not necessarily differ by school's information provision status, and logit regression with the interaction terms displayed the effects of providing the information were not larger for racial minority parents, who had limited access to coproduction due to lacking knowledge.

In sum, the existing government initiatives, which offer necessary knowledge to coproduce, did not effectively improve racial inequities in coproduction, even though they facilitate the general coproduction levels. The findings support the idea that designing a coproduction process and a government initiative should also encompass equity dimensions thoroughly. Alleviating racial inequity should be a main outcome to consider as well as overall coproduction level, when assessing a government initiative's effectiveness.

The majority of parents with language barriers received administrative support from schools: translated materials and interpreters. Those government initiatives increased the parents' probabilities of co-commissioning significantly, but not co-delivery; offering translated materials and interpreters allowed parents with language barriers to better involve themselves in

determining needs, quality, and quantity of public services. Furthermore, sub-group analyses and logit regressions with the interaction terms showed that government initiatives' positive impacts were bigger for the parents in the most need: parents with the severest language issues.

In summary, the government initiatives for parents with limited language skills limited language skills, effectively alleviated general racial inequities especially in co-commissioning, helping the coproduction process not to exclude minorities' needs in public service delivery. However, these alleviating effects mostly applied only to Hispanic parents, revealing racial inequity existed in offering administrative support for parents with language issues.

In other words, Hispanic parents were much more likely to benefit from the government initiatives than Asian parents. As a result, limited access to coproduction improved for Hispanic parents but not for Asian parents, showing unequal provisions of government initiatives maintained unequal access to co-commissioning for the overlooked groups. This is problematic, as inequities in participating in co-commissioning lead to inequalities in public service provision. With the current government initiatives, public service delivery in K-12 education constantly excluded Asian parents' service needs when identifying policy priorities, outcomes, and resource allocations, while it improved on reflecting Hispanic parents' needs.

## Chapter VI: Conclusion

### 6.1. Findings

This dissertation investigated the issues of racial inequity in the most common form of Citizen-State interactions: coproduction of public services. Drawing from the 2012-2019 National Household Education Survey on parental involvement, the study specifically provided findings on racial disparities in coproduction within the K-12 public education context.

*Do racial inequities exist in coproduction?* Racial inequities were prevalent in accessing coproduction activities at school but not at home. White parents were generally more likely than racial minority parents to co-deliver and co-commission at school in terms of serving on school committees. In contrast, racial minority parents were more likely than White parents to co-deliver at home and co-commission at school by attending PTO/PTA meetings.

*Do the racial inequities in coproduction vary by the policy cycle?* The magnitude of racial disparities in the coproduction process overall were larger for co-commissioning than co-delivery. However, the racial gaps in volunteering were only slightly smaller than the racial gaps in serving on school committees. Meanwhile, the racial gaps in attending parent-teacher conferences were significantly smaller than serving on school committees.

*What explains the limited access to coproduction for racial minorities?* Although all racial minority parents faced unequal access to the range of coproduction activities, their challenges in participating in coproduction were due to different reasons. Black parents were less likely to co-deliver and co-commission at school than White parents, mostly because they had less knowledge (college education experience), time, and income. Hispanic parents were less likely to co-deliver than White parents, fully because they had less knowledge (higher education and cultural experience), language skills, and time than White parents. They were also less likely

to co-commission due to lacking knowledge and language skills. Asian parents were less likely than White parents to co-deliver and co-commission, wholly because they had less cultural experience and language skills. Racial disparities in abilities and resources completely explained the racial inequities for Hispanic and Asian parents, but not for Black parents.

*Can government initiatives improve the unequal access to coproduction?* The existing government initiatives to promote coproduction, which offer knowledge to coproduce, did not effectively alleviate the racial disparities in coproduction despite their generally positive impacts on coproduction levels. On the other hand, government initiatives assisting parents with language barriers improved unequal access to co-commissioning for racial minority parents. The initiatives also were more effective for parents in the most need. Yet, the initiatives mostly improved racial inequities for Hispanic parents since schools focused the initiatives on Hispanic parents.

## **6.2. Theoretical Contributions**

This large-N study complements the weakness of current coproduction literature: a lack of scholarship on the costs of coproduction (Steen et al., 2018). The dissertation particularly improves our insufficient understanding on coproduction's negative effects on equity (Cepiku & Mastrodascio, 2021; Jakobsen, 2013; Jaspers & Steen, 2017) especially in terms of racial equity (Gazley, 2021; Kang & Williams). Broadly, it also serves public management research on Citizen-State interactions by advancing its inadequate scholarly work on the interactions' unintended outcomes, such as inequity and exclusion (Jakobsen et al., 2019). The dissertation also advances the existing coproduction literature within the education context, as this study examined different types of coproduction by policy cycle, specifically including co-commissioning.



The study provides an Important guide in studying racial inequities in coproduction. Since the directions and magnitudes of relationships are likely to vary, research should investigate unequal access and exclusion across various coproduction activities by policy cycle rather than focusing solely on one, which has been the common approach in coproduction literature. Racial inequities in coproduction and the government initiatives' impacts on alleviating those inequities were different between co-delivery and co-commissioning.

The findings also support arguments that coproduction and Citizen-State interactions should be studied at all policy stages in order to secure a precise theoretical understanding (Jakobsen et al., 2019; Nabatchi et al., 2017). Additionally, by conducting a study in a new policy arena (education) with a more quantitative approach, this study reinforces the theoretical (Bovaird & Loeffler, 2013) and empirical (Alexander, 2021; Eriksson, 2022; Eriksson et al., 2023; Leino & Puumala, 2021) studies that found co-commissioning explicitly impeded equity in the process more than the other coproduction activities.

By revealing the mechanisms of racial inequities and roles of government initiatives, the dissertation improved upon the lack of research on resolving inequities in accessing coproduction for minority populations (Cepiku & Mastrodascio, 2021; Jakobsen, 2013; Jaspers & Steen, 2017). Moreover, the knowledge gained advises researchers that a one-size fits all approach would not work when investigating the issues of equity and inclusion in coproduction for racial minorities. Each racial group had different causes for the disparities they faced. Moreover, the existing government initiatives' little or null impacts on improving unequal access to coproduction for racial minorities suggest that racial equity should earn more scholarly attention as one of the primary outcomes when studying and evaluating the effectiveness of government initiatives.

## **6.2. Policy Implications**

The study also provides useful policy implications for public managers and policy practitioners. Racial disparities in parental coproduction varied by coproduction's types and levels, which indicates practitioners should address unequal access to the different coproduction activities (parent involvement) separately rather than aggregating all activities, which is currently a common approach in parent involvement studies.

The determinants of racial gaps varied by race, meaning that government initiatives to promote coproduction (parent involvement) need to diversify their strategies for assisting racial minority parents. The limited effects of providing information on improving racial inequity further strengthen this implication. Although all racial minority parents lacked knowledge to coproduce, the type of missing knowledge varied by race: college education or/and cultural experience. Therefore, practitioners should provide more diverse information on coproduction and information that addresses the specific source of the lack of knowledge by race.

Practitioners need to put more effort into recognizing and improving racial gaps in access to co-commissioning. The prevalence of racial disparities were overall more severe with co-commissioning than co-delivery, which presumably will be the most detrimental difference to policy outcomes, equalities, and democratic values (Bovaird & Loeffler, 2022; Eriksson, 2022). In this sense, a broader and stronger implementation of government initiatives assisting parents with language barriers would be beneficial since offering translated materials and interpreters notably increased equal access to co-commissioning for racial minorities. Those language-based initiatives helped racial minority parents to better participate in the decision-making activities at schools.

However, practitioners should review and revise programs to ensure the assistance is equally accessible to all parents in need. For example, the above government initiatives were mainly offered to Hispanics parents but omitted Asian parents, even though both faced substantial challenges due to language barriers. As a result, Asian parents remained with the initial limited access to coproduction at the decision-making stage, which inhibited the government (schools) from being responsive to minorities' needs in public education service provision and inhibited the government's ability to include them in democratic governance through co-commissioning (Bovaird & Loeffler, 2022).

### **6.3. Limitations and Future Research**

Yet, this dissertation does entail some limitations, which calls for future research. The empirical models omitted 'self-efficacy' variable, which coproduction studies commonly included in empirical analyses. Studies found that higher sense of self-efficacy led to higher coproduction level. However, it does not distort this study's primary findings, because self-efficacy is one of the intervening variables for race and is not an antecedent variable. In other words, omitting self-efficacy does not necessarily bias the effects of race through the other intervening variables this study examined.

Moreover, parent involvement studies found that self-efficacy does not affect parental involvement at schools and slightly impacted the involvement at home (Park & Holloway, 2013; Waanders, Mendez, & Downer, 2007). Though, further examinations including self-efficacy would enhance the understanding on constructs of racial inequities in coproduction. For instance, one-third or more of racial gaps for Black parents remained unexplained, which could be due to the racial gaps self-efficacy.

The analyses also did not include information on leadership or street-level bureaucrats, such as the race of the principal or racial match between teacher and child (parent). Both factors are likely to affect parents' coproduction. Future empirical analyses that include these factors will help further explain racial disparities in coproduction that this study could not clarify. For example, racial minority parents were more likely to co-deliver at home, which racial gaps in abilities and resources did not explain. Racial minority parents might be more likely to co-deliver at home because they were more likely to attend racially diverse schools who had higher portions of racially minority teachers.

Unexplained racial gaps in serving on school committees for Black and Asian parents in the final model possibly could be due to the lower likelihood of interacting with school leadership of the same race. In fact, representative and symbolic representative studies found that one's racial match with leadership or staff affects the clients' probabilities of participating in coproduction (M.Riccucci & Ryzin, 2015; Vinopal, 2018). Thus, future studies should examine whether/how racial differences in experience with leadership and staff impact racial inequities in coproduction. Moreover, these studies can explore whether and how to apply representative bureaucracy to alleviate racial gaps in coproduction.

Another limitation might exist since the NHES data is cross-sectional data, which inherently prevents the study from claiming a complete causal relationship. Yet, the findings in the dissertation can be taken without huge concerns, because the key independent variable, race, is antecedent for the other primary independent variables. However, additional research with longitudinal data will enable more accurate examinations on the issue by ruling out any potential reverse causation problems in the analyses, like schoolwork and coproduction.

Additional research to understand the unexpected findings on PTO meetings is necessary, presumably expanding the theoretical framework to nonprofit theories on collective coproduction. Racial minority parents were more than White parents likely to attend PTO/PTA meetings, while they were substantially less likely to co-commission and co-deliver at school. Although the early chapters' discussions presented potential explanations, further examinations will be useful to verify which explanation accurately applies.

Finally, a qualitative study can deepen the understanding on this topic and provide more advanced interpretations of the findings. Particularly, a qualitative approach could help unveil unknown racial disparities. A qualitative approach might uncover questions like: What are the other barriers for Black parents to access coproduction, which can provide insight on the unexplained gaps? Do minority parents face additional psychological costs inhibiting them from accessing coproduction? Why do Asian parents participate in coproductions less than comparable White or even the other racial minority parents despite higher education levels and educational aspirations? Is it due to cultural differences on views of school and teachers, which place greater authority in teachers and command respect of their expertise (Lim, 2012)? Or do Asian parents participate less as they might feel less welcomed and considered than the other racial groups?

These questions cannot be adequately answered by quantitative methods currently dominating studies on Citizen-State interactions (M. E. Guy, 2021); therefore, research should expand its method to qualitative approach, advancing from only asking the available questions to instead also ask the critical questions (M. E. Guy, 2021).

## Appendices

### Appendix A. Question Wording for the Dependent Variables

Table A1. Question Wording for the Dependent Variable

	Question asked:	Original coding	Re-coded
At school	Since the beginning of this school  has <i>any adult in this child's household</i> has done any of the following things t this child's school?		
Volunteering	Served as a volunteer in this child's classroom or elsewhere in the school		
Parent-teacher conferences	Gone to a regularly scheduled parent-teacher conference with this child's teacher	1: Yes 2: No	1: Yes 0: No
School committee	Served on a school committee		
PTO meetings	Attended a meeting of the parent-teacher organization (PTO) or association (PTA)		
At home			
Help HW	How often does <i>any adult in your household</i> check to see that this child's homework is done?	1: Never 2: Less than once a week 3: 1 to 2 days a week 4: 3 to 4 days a week 5: 5 or more days a week	1: At least once per week

## Appendix B. Racial Differences in Coproduction by Child's Race

Table B1. Racial differences in Coproduction by Child's Race

Child	Co-delivery at school		Co-commissioning at school		Co-delivery at home
	Parent-teacher conferences	Volunteering	PTO meetings	School committees	Help with Homework
Black	-0.1 (-0.1)	-14.2*** (-11.6)	11.6*** (8.8)	-4.5*** (-7.5)	11.1*** (9.4)
Hispanic	-3.6*** (-4.2)	-15.6*** (-16.9)	9.0*** (9.1)	-3.0*** (-4.9)	7.3*** (8.1)
Asian	-4.3** (-2.9)	-10.4*** (-6.6)	6.9*** (3.9)	-4.5*** (-5.4)	1.2 (0.7)
Others	1.1 (0.8)	-2.3 (-1.4)	4.1* (2.4)	-1.7 (-1.8)	7.5*** (5.4)
2016	1.7* (2.2)	0.2 (0.2)	1.5 (1.6)	0.2 (0.3)	-2.5** (-2.9)
2019	-0.8 (-1.0)	1.0 (1.1)	1.2 (1.3)	-0.8 (-1.6)	-7.8*** (-9.3)
White in 2012 (constant)	74.8*** (230.8)	37.8*** (102.2)	44.7*** (114.4)	10.4*** (46.7)	66.2*** (186.0)
<i>Observations</i>	38,990	38,990	38,990	38,990	37,020

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

## Appendix C. Chapter 4 - Summary Statistics

Table C1. Descriptive Statistics - Independent Variables

	2012	2016	2019
	(%)	(%)	(%)
<u>Parent's race</u>			
White	58	57	57
Black	14	14	14
Hispanic	22	23	23
Asian	6	7	6
Born in U.S.	75	73	75
Holds B.A. degree	30	36	39
<u>English proficiency</u>			
Mostly speaks Spanish or other language now	13	14	13
Mostly speaks English now	11	12	14
Speaks English as the first language	76	74	73
Single parent	27	26	25
Number of siblings (mean)	1.38 (SD=1.14)	1.42 (SD=1.02)	1.44 (SD=1.12)
<u>Household income</u>			
\$0 to \$10,000	6	5	4
\$10,001 to \$20,000	9	8	6
\$20,001 to \$30,000	10	9	7
\$30,001 to \$40,000	10	9	8
\$40,001 to \$50,000	9	8	7
\$50,001 to \$60,000	8	7	7
\$60,001 to \$75,000	10	10	10
\$75,001 to \$100,000	13	13	14
\$100,001 to \$150,000	14	16	18
\$150,001 or more	10	13	18
Receives government assistance	34	34	33
<i>Observations</i>	14,460	10,790	12,480

Source: NHES 2012, 2016, and 2019



Table C2. Descriptive Statistics - Child Controls

	2012	2016	2019
	(%)	(%)	(%)
Expects child to earn B.A. degree	67	70	70
<u>Child attends</u>			
Elementary school	50	48	47
Middle school	22	22	24
High school	28	30	29
<u>Child's schoolwork</u>			
Failing	1	1	1
Below Average	5	5	5
Average	34	31	32
Above average	31	31	31
Excellent	29	31	32
Female	72	73	70
Age	42	42	42
	(SD=9)	(SD=8)	(SD=9)
<i>Observations</i>	14,460	10,790	12,480

Source: NHES 2012, 2016, and 2019

Table C3. Descriptive Statistics - School Controls

	2012	2016	2019
	(%)	(%)	(%)
<b>School characteristics</b>			
Racial diversity index (0-10)	Mean: 4.1 (SD:2.2)	Mean:4.3 (SD:2.0)	Mean:4.5 (SD:2.0)
Portion of racial minority students	37 [SD=33]	39 [SD=30]	39 [SD=31]
<u>Portion of free-reduced lunch students</u>			
Below 25% (Low poverty)	27	23	24
25% - 75%	55	55	55
Above 75% (High poverty)	18	22	20
<u>Enrollment size</u>			
Under 300	7	7	7
Between 300 and 599	34	33	34
Between 600 and 999	32	31	31
Between 1,000 and 2,499	24	25	24
2,500 or more	3	4	4
<i>Observations</i>	13,820	10,700	11,780

Source: NHES 2012,2016, and 2019

## Appendix D. Chapter 4 - Bivariate Regressions

Table D1. Racial Differences in Child and Community Controls

	Child		Community			
	Expect B.A. for child	Above average schoolwork	Attending school	Portion of families in poverty	Portion of minorities	Urban
Black	-1.5 (-1.1)	-7.5*** (-6.0)	-0.0 (-1.2)	6.0*** (29.5)	33.6*** (48.3)	-2.9** (-2.6)
Hispanic	7.2*** (7.9)	-7.5*** (-6.6)	-0.0* (-2.6)	5.4*** (34.8)	34.4*** (60.1)	0.4 (0.4)
Asian	20.5*** (10.9)	16.0*** (10.9)	-0.1* (-2.2)	0.0 (0.1)	9.4*** (15.3)	10.6*** (6.1)
2016	2.5** (3.1)	1.5 (1.6)	0.0 (1.6)	0.3* (2.3)	1.1* (2.5)	6.2*** (6.4)
2019	2.0* (2.4)	1.8* (2.2)	0.0*** (4.5)	-1.4*** (-11.7)	0.2 (0.4)	5.4*** (6.2)
White in 2012 (Constant)	68.4*** (205.6)	62.1*** (167.2)	1.8*** (223.8)	6.5*** (76.1)	16.2*** (61.1)	42.0*** (110.9)
<i>Observations</i>	37,730	37,730	37,730	36,300	36,300	36,300

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Table D2. General Effects of School Characteristics on Coproduction

	At school				At home
	Co-delivery		Co-commissioning		Co-delivery
	Parent-teacher conferences	Volunteering	School committees	PTO meetings	Help with homework
<u>Enrollment size (reference: Under 300)</u>					
Between 300 and 599	0.6 (0.5)	3.3 (2.0)	-2.5* (-2.4)	-0.5 (-0.3)	6.8*** (4.4)
Between 600 and 999	-5.6*** (-4.3)	-2.3 (-1.4)	-4.0*** (-3.6)	-4.3* (-2.4)	0.9 (0.6)
Between 1,000 and 2,499	-26.4*** (-18.7)	-15.2*** (-8.9)	-5.8*** (-5.3)	-13.6*** (-7.5)	-25.9*** (-15.4)
2,500 or more	-40.1*** (-18.5)	-18.6*** (-8.5)	-5.4*** (-4.1)	-18.0*** (-7.6)	-37.5*** (-16.2)
<u>School poverty (reference: Below 25%)</u>					
25-75%	-6.0*** (-8.8)	-12.6*** (-13.9)	-4.3*** (-7.1)	-5.5*** (-5.9)	-1.5 (-1.8)
75% higher	-4.0** (-3.0)	-16.6*** (-10.4)	-5.4*** (-5.9)	-1.9 (-1.1)	5.1** (3.3)
Racial diversity (0~10)	1.2*** (7.3)	0.9*** (4.1)	0.2 (1.0)	1.2*** (5.5)	1.5*** (7.7)
Portion of minorities	-0.0 (-1.6)	-0.1*** (-7.5)	-0.0 (-0.9)	0.1*** (7.8)	0.1*** (5.8)
2016	2.2** (2.8)	1.2 (1.3)	0.5 (0.8)	1.6 (1.7)	-1.6 (-1.9)
2019	-0.6 (-0.7)	1.2 (1.3)	-0.6 (-1.1)	1.4 (1.5)	-7.4*** (-8.8)
<i>Observations</i>	36,300	36,300	36,300	36,300	34,550

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

## Appendix E. Chapter 4 - Racial Disparities in Coproduction Full Tables

Table E1. Co-Delivery at School: Parent-Teacher Conferences

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-0.1 (-0.1)	1.5 (1.4)	1.3 (1.2)	1.9 (1.7)	1.7 (1.6)	2.4* (2.0)	2.6* (2.3)
Hispanic	-7.2*** (-7.5)	-3.0** (-2.9)	-0.8 (-0.6)	-0.6 (-0.5)	-0.6 (-0.6)	1.9 (1.6)	2.1 (1.8)
Asian	-3.8** (-2.8)	-2.2 (-1.4)	-1.6 (-1.0)	-1.2 (-0.7)	-1.2 (-0.7)	-0.5 (-0.3)	-1.3 (-0.8)
US-born		3.3** (3.1)	-0.3 (-0.2)	-0.3 (-0.2)	-0.3 (-0.2)	-0.8 (-0.6)	-0.5 (-0.3)
B.A. holder		8.1*** (13.3)	7.8*** (12.8)	7.6*** (12.3)	7.5*** (11.2)	6.4*** (9.7)	4.9*** (7.4)
Mostly English			6.8*** (4.1)	7.1*** (4.2)	7.1*** (4.2)	6.1*** (3.5)	6.4*** (3.7)
English first language			8.7*** (4.1)	9.3*** (4.4)	9.4*** (4.4)	8.1*** (3.7)	9.2*** (4.3)
Single parent				-2.4** (-3.0)	-2.4** (-2.8)	-1.4 (-1.6)	-0.3 (-0.3)
Number of siblings				1.0** (2.7)	0.9* (2.4)	0.9* (2.3)	0.9* (2.4)
Household income					0.3 (1.7)	0.4* (2.3)	0.4* (2.1)
Government aid					2.6** (2.8)	1.4 (1.5)	0.7 (0.8)

Table E1. Co-Delivery at School: Parent-Teacher Conferences (continued)

<u>Enrollment size</u>		
Between 300 and 599	0.2 (0.2)	-2.7 (-1.9)
Between 600 and 999	-5.6*** (-4.2)	-5.6*** (-3.9)
Between 1,000 and 2,499	-24.2*** (-16.7)	-11.1*** (-7.6)
2,500 or more	-36.3*** (-16.1)	-16.1*** (-7.7)
<u>School poverty</u>		
25% to 75%	-4.6*** (-6.5)	-3.0*** (-4.4)
More than 75%	-2.2 (-1.6)	-3.0* (-2.3)
Racial diversity index	1.1*** (6.2)	0.5** (3.2)
Portion of minorities	-0.0 (-0.5)	-0.0 (-1.6)
Expect child BA degree		-0.1 (-0.1)
<u>Grade</u>		
Middle		-17.9*** (-19.1)
High		-28.9*** (-26.6)

Table E1. Co-Delivery at School: Parent-Teacher Conferences (continued)

<u>Schoolwork</u>							
Below Average							-4.1 (-1.2)
Average							-8.4** (-2.7)
Above average							-10.5*** (-3.4)
Excellent							-10.9*** (-3.4)
ESL enrolled							4.3* (2.3)
Female	-3.2*** (-4.7)	-2.9*** (-4.3)	-2.9*** (-4.3)	-2.7*** (-3.9)	-2.7*** (-3.9)	-2.2** (-3.2)	-1.4* (-2.1)
Age	-2.5*** (-9.0)	-2.9*** (-10.2)	-2.8*** (-10.1)	-2.9*** (-10.2)	-2.8*** (-10.0)	-1.7*** (-6.1)	0.0 (0.2)
Age <sup>2</sup>	0.0*** (7.1)	0.0*** (8.3)	0.0*** (8.2)	0.0*** (8.4)	0.0*** (8.1)	0.0*** (5.1)	-0.0 (-0.1)
2016	2.2** (2.8)	1.8* (2.3)	1.8* (2.3)	1.8* (2.2)	1.7* (2.1)	1.9* (2.5)	1.8* (2.4)
2019	0.1 (0.1)	-0.6 (-0.8)	-0.6 (-0.7)	-0.7 (-0.9)	-0.9 (-1.1)	-1.2 (-1.4)	-0.7 (-0.9)
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Table E2. Co-Delivery at School: Volunteering

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-13.8*** (-11.3)	-9.7*** (-7.8)	-9.9*** (-8.2)	-7.1*** (-5.7)	-4.8*** (-3.7)	-3.3* (-2.3)	-3.7** (-2.8)
Hispanic	-16.5*** (-16.6)	-6.8*** (-5.4)	-3.3* (-2.3)	-2.6 (-1.8)	-1.7 (-1.2)	0.8 (0.5)	1.1 (0.8)
Asian	-9.3*** (-5.8)	-3.7 (-1.9)	-2.8 (-1.4)	-2.0 (-1.0)	-2.3 (-1.2)	-2.3 (-1.2)	-3.6* (-2.1)
US-born		9.4*** (7.8)	3.7* (2.3)	3.8* (2.4)	2.9 (1.8)	2.7 (1.6)	4.4** (2.8)
B.A. holder		19.7*** (25.7)	19.2*** (25.0)	18.0*** (23.5)	13.5*** (16.4)	12.2*** (14.9)	7.2*** (8.7)
Mostly English			10.3*** (6.2)	10.4*** (6.3)	8.5*** (5.0)	8.1*** (4.7)	7.5*** (4.4)
English first language			13.7*** (6.7)	14.5*** (7.2)	12.4*** (6.0)	11.8*** (5.7)	12.3*** (5.9)
Single parent				-10.0*** (-11.6)	-6.2*** (-6.5)	-5.7*** (-6.0)	-4.5*** (-4.9)
Number of siblings				0.6 (1.4)	1.0* (2.3)	1.0* (2.3)	0.8* (2.1)
Household income					1.7*** (8.6)	1.6*** (7.9)	1.2*** (5.9)
Government aid					-3.3** (-2.9)	-3.8*** (-3.3)	-2.8* (-2.5)

Table E2. Co-Delivery at School: Volunteering (continued)

<u>Enrollment size</u>		
Between 300 and 599	2.4 (1.5)	-0.5 (-0.3)
Between 600 and 999	-3.8* (-2.4)	-3.1 (-1.9)
Between 1,000 and 2,499	-15.4*** (-9.5)	-7.0*** (-4.1)
2,500 or more	-18.4*** (-8.6)	-8.0*** (-3.4)
<u>School poverty</u>		
25% to 75%	-6.2*** (-6.9)	-4.2*** (-4.8)
More than 75%	-6.2*** (-3.6)	-6.2*** (-3.8)
Racial diversity index	0.7** (3.0)	0.2 (0.9)
Portion of minorities	-0.0 (-0.6)	-0.0 (-1.7)
Expect child BA degree		7.7*** (8.0)
<u>Grade</u>		
Middle		-20.2*** (-21.7)
High		-19.7*** (-17.4)



Table E2. Co-Delivery at School: Volunteering (continued)

<u>Schoolwork</u>							
Below Average							8.3 (1.9)
Average							11.4** (2.8)
Above average							17.9*** (4.3)
Excellent							21.4*** (5.1)
ESL enrolled							-1.3 (-0.5)
Female	-3.7*** (-4.5)	-3.0*** (-3.8)	-3.0*** (-3.8)	-2.1** (-2.7)	-1.1 (-1.4)	-0.7 (-1.0)	0.5 (0.6)
Age	1.7*** (4.6)	0.5 (1.4)	0.6 (1.7)	0.3 (1.0)	-0.4 (-1.1)	0.2 (0.6)	1.4*** (4.3)
Age <sup>2</sup>	-0.0*** (-5.6)	-0.0** (-2.7)	-0.0** (-3.0)	-0.0* (-2.2)	-0.0 (-0.2)	-0.0 (-1.4)	-0.0*** (-4.2)
2016	0.5 (0.5)	-0.5 (-0.6)	-0.5 (-0.5)	-0.5 (-0.5)	-0.8 (-0.9)	-0.4 (-0.5)	-0.4 (-0.5)
2019	1.2 (1.3)	-0.5 (-0.6)	-0.5 (-0.6)	-0.5 (-0.6)	-1.4 (-1.6)	-1.4 (-1.6)	-0.7 (-0.8)
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Table E3. Co-Commissioning at School: School Committees

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	-4.3*** (-7.1)	-2.8*** (-4.4)	-2.8*** (-4.6)	-1.9** (-2.8)	-1.1 (-1.6)	-1.8* (-2.3)	-1.8* (-2.3)
Hispanic	-2.7*** (-3.8)	1.2 (1.3)	2.5 (1.9)	2.7* (2.1)	3.1* (2.4)	2.7 (1.8)	2.7 (1.8)
Asian	-4.3*** (-5.2)	-2.5* (-2.4)	-1.8 (-1.6)	-1.4 (-1.2)	-1.6 (-1.4)	-1.6 (-1.4)	-1.7 (-1.5)
US-born		3.1*** (4.1)	1.6 (1.6)	1.7 (1.6)	1.3 (1.3)	1.2 (1.2)	1.9 (1.8)
B.A. holder		8.1*** (16.4)	8.1*** (16.3)	7.6*** (15.4)	5.8*** (10.9)	5.7*** (10.7)	4.2*** (7.9)
Mostly English			0.4 (0.4)	0.6 (0.6)	-0.1 (-0.1)	-0.0 (-0.0)	0.5 (0.5)
English first language			2.9 (1.93)	3.4* (2.3)	2.6 (1.6)	2.7 (1.8)	3.5* (2.3)
Single parent				-3.8*** (-7.3)	-2.5*** (-4.1)	-2.4*** (-3.9)	-2.4*** (-3.8)
Number of siblings				0.8** (2.9)	0.9** (3.1)	0.9** (3.1)	0.9** (3.1)
Household income					0.8*** (5.9)	0.8*** (6.0)	0.7*** (4.8)
Government aid					-0.4 (-0.4)	-0.6 (-0.7)	-0.1 (-0.2)

Table E3. Co-Commissioning at School: School Committees (continued)

Enrollment size

Between 300 and 599	-3.1**	-3.5**
	(-2.8)	(-3.2)
Between 600 and 999	-5.1***	-5.3***
	(-4.6)	(-4.7)
Between 1,000 and 2,499	-6.8***	-7.2***
	(-6.2)	(-6.2)
2,500 or more	-6.6***	-7.2***
	(-5.0)	(-5.1)

School poverty

25% to 75%	-1.1*	-0.9
	(-2.1)	(-1.8)
More than 75%	-0.5	-0.5
	(-0.5)	(-0.5)

Racial diversity index	0.1	0.1
	(0.7)	(0.7)

Portion of minorities	0.0	0.0
	(1.9)	(1.6)

Expect child BA degree		3.4***
		(4.8)

Grade

Middle		-1.9**
		(-3.2)

High		0.2
		(0.3)

Table E3. Co-Commissioning at School: School Committees (continued)

<u>Schoolwork</u>							
Below Average							0.9 (0.3)
Average							3.4 (1.3)
Above average							5.2* (2.0)
Excellent							7.5** (2.9)
ESL enrolled							2.1 (1.2)
Female	1.0* (2.2)	1.3** (2.8)	1.3** (2.8)	1.6*** (3.5)	1.9*** (4.3)	2.0*** (4.4)	2.2*** (4.8)
Age	1.4*** (5.2)	0.8** (3.3)	0.8*** (3.3)	0.7** (2.9)	0.5 (1.8)	0.6* (2.5)	0.7** (2.8)
Age <sup>2</sup>	-0.0*** (-5.0)	-0.0** (-3.2)	-0.0** (-3.2)	-0.0** (-2.7)	-0.0 (-1.7)	-0.0* (-2.2)	-0.0* (-2.5)
2016	0.2 (0.3)	-0.2 (-0.4)	-0.2 (-0.4)	-0.3 (-0.4)	-0.4 (-0.7)	-0.4 (-0.7)	-0.4 (-0.7)
2019	-0.7 (-1.3)	-1.4* (-2.6)	-1.4* (-2.5)	-1.4** (-2.6)	-1.8** (-3.3)	-1.9*** (-3.4)	-1.7** (-3.0)
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Table E4. Co-Commissioning at School: PTO/PTA Meetings

	M1	M2	M3	M4	M5	M6	M7
PTO meetings	Knowledge		Language	Time	Income	School	Child
Black	12.8*** (9.8)	12.5*** (9.4)	12.4*** (9.4)	13.4*** (10.0)	12.9*** (9.5)	10.5*** (7.1)	10.5*** (7.1)
Hispanic	9.7*** (8.9)	6.9*** (5.3)	6.5*** (4.3)	6.7*** (4.4)	6.5*** (4.3)	5.6*** (3.4)	5.7*** (3.5)
Asian	7.2*** (4.0)	1.3 (0.6)	0.6 (0.3)	1.1 (0.5)	1.1 (0.5)	0.7 (0.3)	-0.0 (-0.0)
US-born		-6.6*** (-5.1)	-6.2*** (-3.7)	-6.2*** (-3.7)	-6.0*** (-3.6)	-6.1*** (-3.7)	-5.2*** (-3.2)
B.A. holder		3.6*** (4.6)	3.6*** (4.5)	3.2*** (4.0)	3.8*** (4.4)	3.2*** (3.7)	1.4 (1.5)
Mostly English			2.0 (1.1)	2.2 (1.2)	2.6 (1.4)	2.3 (1.3)	3.2 (1.8)
English first language			-0.1 (-0.1)	0.5 (0.2)	0.8 (0.4)	0.9 (0.4)	2.5 (1.1)
Single parent				-3.8*** (-3.9)	-4.4*** (-4.3)	-3.9*** (-3.9)	-3.2*** (-3.2)
Number of siblings				1.0* (2.2)	0.8 (1.9)	0.8 (1.9)	0.6 (1.4)
Household income					-0.0 (-0.2)	0.1 (0.2)	-0.1 (-0.3)
Government aid					2.6* (2.2)	1.8 (1.5)	2.0 (1.7)

Table E4. Co-Commissioning at School: PTO/PTA Meetings (continued)

<u>Enrollment size</u>		
Between 300 and 599	-0.7 (-0.4)	-2.3 (-1.3)
Between 600 and 999	-4.5* (-2.5)	-4.5* (-2.5)
Between 1,000 and 2,499	-13.7*** (-7.5)	-8.3*** (-4.4)
2,500 or more	-18.1*** (-7.7)	-10.5*** (-4.1)
<u>School poverty</u>		
25% to 75%	-3.7*** (-3.9)	-2.9** (-2.9)
More than 75%	-0.3 (-0.2)	-0.7 (-0.4)
Racial diversity index	0.9*** (4.2)	0.7** (3.1)
Portion of minorities	0.1* (2.5)	0.0 (1.9)
Expect child BA degree		2.3* (2.2)
<u>Grade</u>		
Middle		-8.4*** (-7.7)
High		-12.7*** (-10.3)

Table E4. Co-Commissioning at School: PTO/PTA Meetings (continued)

<u>Schoolwork</u>							
Below Average							-1.0 (-0.2)
Average							-2.3 (-0.4)
Above average							-2.5 (-0.5)
Excellent							2.6 (0.5)
ESL enrolled							5.6* (2.2)
Female	-5.4*** (-6.3)	-4.9*** (-5.8)	-4.9*** (-5.8)	-4.5*** (-5.3)	-4.7*** (-5.5)	-4.5*** (-5.3)	-4.0*** (-4.7)
Age	-0.6* (-2.1)	-0.9** (-3.1)	-0.9** (-3.0)	-1.0*** (-3.3)	-0.9** (-2.8)	-0.3 (-0.9)	0.4 (1.3)
Age <sup>2</sup>	0.0 (1.5)	0.0* (2.4)	0.0* (2.4)	0.0** (2.8)	0.0* (2.3)	0.0 (0.9)	-0.0 (-0.9)
2016	1.8 (1.8)	1.5 (1.6)	1.5 (1.6)	1.5 (1.5)	1.4 (1.5)	1.4 (1.4)	1.3 (1.3)
2019	1.7 (1.8)	1.5 (1.6)	1.4 (1.5)	1.3 (1.4)	1.4 (1.4)	1.0 (1.0)	1.0 (1.1)
Observations	36,300	36,300	36,300	36,300	36,300	36,300	36,260

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012,2016, and 2019

Table E5. Co-Delivery at Home: Help with Homework

	M1	M2	M3	M4	M5	M6	M7
		Knowledge	Language	Time	Income	School	Child
Black	10.2*** (8.9)	11.2*** (9.5)	11.1*** (9.4)	11.4*** (9.6)	10.1*** (8.2)	7.0*** (5.2)	7.0*** (5.7)
Hispanic	3.3*** (3.4)	5.7*** (5.0)	6.5*** (5.1)	6.6*** (5.2)	6.0*** (4.7)	5.4*** (4.0)	5.3*** (4.3)
Asian	1.3 (0.9)	3.0 (1.7)	2.9 (1.6)	3.0 (1.6)	3.1 (1.7)	3.2 (1.6)	2.0 (1.1)
US-born		2.6* (2.2)	1.1 (0.7)	1.1 (0.7)	1.6 (1.0)	1.3 (0.8)	1.3 (0.9)
B.A. holder		3.6*** (5.1)	3.4*** (4.8)	3.2*** (4.5)	5.6*** (7.3)	4.6*** (6.2)	2.4** (3.2)
Mostly English			4.3** (2.6)	4.3** (2.6)	5.6*** (3.3)	5.0** (2.9)	4.4** (2.8)
English first language			4.0 (1.9)	4.1 (1.9)	5.5** (2.6)	5.3* (2.4)	5.8** (2.9)
Single parent				-1.6 (-1.8)	-3.9*** (-4.1)	-2.8** (-2.9)	-1.4 (-1.6)
Number of siblings				-0.1 (-0.3)	-0.3 (-0.8)	-0.4 (-0.9)	-0.4 (-1.1)
Household income					-1.0*** (-4.8)	-0.7*** (-3.5)	-0.8*** (-4.1)
Government aid					2.4* (2.2)	0.7 (0.7)	-0.5 (-0.5)



Table E5. Co-Delivery at Home: Help with Homework (continued)

<u>Enrollment size</u>		
Between 300 and 599	6.6*** (4.2)	2.3 (1.5)
Between 600 and 999	1.9 (1.2)	3.6* (2.4)
Between 1,000 and 2,499	-20.7*** (-12.0)	1.9 (1.2)
2,500 or more	-30.2*** (-12.3)	2.0 (0.9)
<u>School poverty</u>		
25% to 75%	-2.6** (-3.1)	0.3 (0.4)
More than 75%	2.8 (1.8)	1.8 (1.2)
Racial diversity index	1.3*** (6.9)	0.3 (1.4)
Portion of minorities	0.1** (3.1)	0.0 (1.9)
Expect child BA degree		1.3 (1.5)
<u>Grade</u>		
Middle		-27.3*** (-28.8)
High		-49.5*** (-45.3)

Table E5. Co-Delivery at Home: Help with Homework (continued)

<u>Schoolwork</u>							
Below Average							2.0 (0.4)
Average							1.4 (0.3)
Above average							-2.9 (-0.6)
Excellent							-8.3 (-1.7)
ESL enrolled							1.6 (0.8)
Female	-6.5*** (-8.8)	-6.4*** (-8.8)	-6.4*** (-8.8)	-6.3*** (-8.6)	-6.8*** (-9.3)	-6.3*** (-8.8)	-5.0*** (-7.3)
Age	-4.9*** (-14.6)	-5.0*** (-14.9)	-5.0*** (-14.8)	-5.0*** (-14.9)	-4.7*** (-13.8)	-3.2*** (-10.0)	-0.5 (-1.6)
Age <sup>2</sup>	0.0*** (11.1)	0.0*** (11.5)	0.0*** (11.4)	0.0*** (11.5)	0.0*** (10.5)	0.0*** (7.5)	0.0 (0.7)
2016	-0.8 (-1.0)	-1.0 (-1.2)	-1.0 (-1.1)	-1.0 (-1.1)	-0.8 (-0.9)	-1.0 (-1.2)	-1.3 (-1.7)
2019	-6.0*** (-7.0)	-6.4*** (-7.3)	-6.4*** (-7.3)	-6.4*** (-7.4)	-5.9*** (-6.7)	-6.5*** (-7.6)	-5.5*** (-7.0)
Observations	34,480	34,480	34,480	34,480	34,480	34,480	34,440

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

## Appendix F. Chapter 5.1. - Proportion Tests

Table F1. Information Provision by Race

2012	White	Black	Hispanic	Asian
Does not do it at all	14	-3**	-3**	-5**
Not very well	10	0.4	2	-2
Just okay	34	-2	8***	6*
Very well	43	5	-7***	0.3

Source: NHES 2012, 2016, 2019

2016	White	Black	Hispanic	Asian
Does not do it at all	13	2	-3**	-3
Not very well	10	0.5	2	-3*
Just okay	32	-3	9***	6
Very well	45	1	-7**	0.6

Source: NHES 2012, 2016, 2019

2019	White	Black	Hispanic	Asian
Does not do it at all	13	-1	-4***	-3
Not very well	10	-2	0.3	-1
Just okay	34	-3	5***	8***
Very well	43	5	-2	-4

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, 2019

Table F2. Coproduction by Information Provision

2012

	Not at all	Not very well	Just okay	Very well
PT conferences	59	5	15***	24***
Volunteering	23	1	11***	25***
Committees	6	2	2**	8***
PTO meetings	30	7**	12***	21***
Help with homework	46	15***	24***	31***

Source: NHES 2012, 2016, 2019

2016

	Not at all	Not very well	Just okay	Very well
PT conferences	62	4	13***	21***
Volunteering	24	0	11***	22***
Committees	6	2	3**	8***
PTO meetings	32	1	13***	21***
Help with homework	44	17***	24***	31***

Source: NHES 2012, 2016, 2019

2019

	Not at all	Not very well	Just okay	Very well
PT conferences	55	8*	18***	27***
Volunteering	24	4	12***	22***
Committees	6	1	3***	6***
PTO meetings	29	10***	15***	24***
Help with homework	41	16***	21***	28***

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012, 2016, 2019

## Appendix G. Chapter 5.1. – Extra Ordinal and Logit Regressions

Table G1. Racial Differences in Information Provision

	School provides information on	
	The expected role	How to help with homework
<u>Black</u>		
Not at all	-1.3** (-2.8)	-1.8** (-3.1)
Not very well	-0.8** (-2.7)	-1.1** (-3.0)
Just okay	-1.1* (-2.5)	-0.8** (-2.6)
Very well	3.3** (2.7)	3.7** (3.0)
<u>Hispanic</u>		
Not at all	0.9* (2.3)	-1.5*** (-3.6)
Not very well	0.5* (2.3)	-0.9*** (-3.6)
Just okay	0.6* (2.4)	-0.6** (-3.2)
Very well	-2.0* (-2.3)	3.0*** (3.5)
<u>Asian</u>		
Not at all	-0.8 (-1.3)	-2.3*** (-3.7)
Not very well	-0.5 (-1.3)	-1.4*** (-3.6)
Just okay	-0.6 (-1.2)	-1.1** (-3.0)
Very well	2.0 (1.3)	4.7*** (3.5)
<u>White in 2012</u>		
Not at all	14	16
Not very well	10	12
Just okay	34	32
Very well	43	40
<i>Observations</i>	36,390	36,390

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Table G2. Spurious Effects of Satisfaction

	Parent-teacher conferences		Volunteering		School committee	
Add		Info		Info		Info
School satisfaction	6.7*** (13.5)	0.6 (0.9)	12.1*** (18.0)	5.9*** (7.6)	3.9*** (9.4)	1.9*** (4.1)
Information						
Not very well		5.5*** (3.5)		1.9 (1.3)		2.2* (2.4)
Just okay		14.8*** (11.8)		9.7*** (8.2)		2.1*** (3.6)
Very well		23.2*** (18.2)		18.9*** (14.8)		6.1*** (8.6)
<i>Observations</i>	36,300	36,300	36,300	36,300	36,300	36,300

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Only year controlled.

## Appendix H. Chapter 5.1. - Providing Information and Coproduction Full Tables

Table H1. Parent-Teacher Conferences

	Model 8	Model 9	Model 10
Black	2.7* (2.3)	2.0 (1.7)	2.0 (1.7)
Hispanic	2.3 (1.9)	1.8 (1.5)	1.8 (1.5)
Asian	-1.5 (-0.9)	-1.7 (-1.1)	-1.8 (-1.1)
Not very well		3.2* (2.5)	3.2* (2.5)
Just okay		9.3*** (8.9)	9.4*** (8.7)
Very well		14.3*** (13.6)	14.5*** (12.6)
Satisfaction index			-0.2 (-0.4)
U.S. born	-0.4 (-0.3)	-0.4 (-0.3)	-0.4 (-0.3)
B.A. holder	4.8*** (7.2)	4.7*** (7.0)	4.7*** (7.0)
Mostly English	6.3*** (3.7)	6.1*** (3.6)	6.0*** (3.6)
English first language	9.2*** (4.3)	8.7*** (4.1)	8.7*** (4.1)

Table H1. Parent-Teacher Conferences (continued)

Single parent	-0.4 (-0.5)	-0.1 (-0.2)	-0.1 (-0.2)
Number of siblings	0.9* (2.4)	0.9* (2.4)	0.9* (2.4)
Household income	0.4* (2.1)	0.4* (2.3)	0.4* (2.3)
Government assistance	0.7 (0.7)	0.5 (0.6)	0.5 (0.6)
Expect B.A. for child	-0.2 (-0.2)	-0.1 (-0.2)	-0.1 (-0.2)
Moved for school	0.1 (0.1)	-0.3 (-0.4)	-0.3 (-0.4)
Middle school	-17.9*** (-19.1)	-16.7*** (-17.5)	-16.7*** (-17.5)
High school	-28.7*** (-26.1)	-26.1*** (-23.7)	-26.1*** (-23.7)
Below average	-4.2 (-1.3)	-4.9 (-1.7)	-4.9 (-1.6)
Average	-8.4** (-2.7)	-9.6*** (-3.5)	-9.5*** (-3.4)
Above average	-10.5*** (-3.4)	-12.3*** (-4.5)	-12.2*** (-4.4)
Excellent	-10.9*** (-3.5)	-13.6*** (-4.9)	-13.5*** (-4.8)



Table H1. Parent-Teacher Conferences (continued)

ESL enrolled	4.2*	3.4	3.4
	(2.2)	(1.8)	(1.8)
Enrollment size			
Between 300 and 599	-3.1*	-2.8	-2.8
	(-2.1)	(-1.9)	(-1.9)
Between 600 and 999	-6.0***	-5.4***	-5.4***
	(-4.2)	(-3.7)	(-3.7)
Between 1,000 and 2,499	-11.7***	-11.0***	-11.0***
	(-7.9)	(-7.4)	(-7.3)
2,500 or more	-16.8***	-16.1***	-16.1***
	(-7.9)	(-7.6)	(-7.6)
School poverty			
25% to 75%	-2.7***	-2.4***	-2.4***
	(-3.8)	(-3.3)	(-3.4)
more than 75%	-2.9*	-2.4	-2.5
	(-2.1)	(-1.8)	(-1.8)
Diversity index	0.4*	0.4*	0.4*
	(2.1)	(2.1)	(2.1)
% of minority students	-0.0	0.0	-0.0
	(-0.3)	(0.0)	(-0.0)
Suburb	-1.6	-1.7*	-1.7*
	(-1.9)	(-2.0)	(-2.0)
Town	-1.9	-1.9	-1.9
	(-1.4)	(-1.3)	(-1.4)
Rural	-3.8***	-3.4***	-3.4***
	(-3.7)	(-3.4)	(-3.4)

Table H1. Parent-Teacher Conferences (continued)

Portions_poverty_zip	-0.0 (-0.3)	-0.0 (-0.2)	-0.0 (-0.2)
Portions_minorities_zip	-0.0 (-1.2)	-0.0 (-1.5)	-0.0 (-1.5)
Female	-1.4* (-2.0)	-1.3 (-1.9)	-1.3 (-1.9)
Age	0.1 (0.2)	0.1 (0.3)	0.1 (0.3)
Age^2	-0.0 (-0.1)	-0.0 (-0.2)	-0.0 (-0.2)
2016	1.7* (2.2)	1.6* (2.1)	1.6* (2.1)
2019	-0.9 (-1.1)	-1.1 (-1.4)	-1.1 (-1.4)
Observations	36,250	36,250	36,250

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Table H2. Volunteering

	Model 8	Model 9	Model 10
Black	-4.4** (-3.2)	-5.0*** (-3.7)	-5.0*** (-3.7)
Hispanic	0.7 (0.5)	0.3 (0.2)	0.3 (0.2)
Asian	-4.1* (-2.3)	-4.3* (-2.4)	-4.2* (-2.4)
Not very well		2.5 (1.8)	2.5 (1.9)
Just okay		9.1*** (8.2)	9.0*** (8.0)
Very well		14.8*** (13.5)	14.6*** (12.1)
Satisfaction index			0.3 (0.4)
U.S. born	4.4** (2.8)	4.3** (2.8)	4.4** (2.8)
B.A. holder	7.0*** (8.5)	6.9*** (8.5)	6.9*** (8.5)
Mostly English	7.5*** (4.5)	7.2*** (4.4)	7.2*** (4.4)
English first language	12.5*** (6.1)	11.8*** (5.8)	11.8*** (5.8)
Single parent	-4.8*** (-5.1)	-4.4*** (-4.8)	-4.4*** (-4.8)

Table H2. Volunteering (continued)

Number of siblings	0.9* (2.2)	0.8* (2.2)	0.8* (2.2)
Household income	1.1*** (5.6)	1.2*** (5.8)	1.2*** (5.8)
Government assistance	-2.7* (-2.4)	-2.6* (-2.4)	-2.6* (-2.4)
Expect B.A. for child	7.5*** (7.9)	7.6*** (7.9)	7.6*** (8.0)
Moved for school	3.6*** (4.0)	3.1*** (3.6)	3.1*** (3.5)
Middle school	-20.1*** (-21.4)	-18.4*** (-19.7)	-18.4*** (-19.6)
High school	-19.3*** (-16.9)	-16.8*** (-14.5)	-16.7*** (-14.4)
Below average	8.1 (1.9)	7.7 (1.6)	7.6 (1.6)
Average	11.4** (2.8)	10.4* (2.3)	10.3* (2.3)
Above average	17.8*** (4.3)	16.2*** (3.6)	16.0*** (3.5)
Excellent	21.3*** (5.1)	18.6*** (4.1)	18.4*** (4.0)
ESL enrolled	-1.5 (-0.6)	-2.4 (-1.0)	-2.4 (-1.0)

Table H2. Volunteering (continued)

Enrollment size			
Between 300 and 599	-0.6 (-0.4)	-0.2 (-0.2)	-0.2 (-0.2)
Between 600 and 999	-3.5* (-2.2)	-2.9 (-1.9)	-2.9 (-1.9)
Between 1,000 and 2,499	-7.7*** (-4.5)	-6.8*** (-4.0)	-6.8*** (-4.0)
2,500 or more	-9.0*** (-3.8)	-8.4*** (-3.5)	-8.4*** (-3.5)
School poverty			
25% to 75%	-3.2*** (-3.5)	-2.9** (-3.1)	-2.9** (-3.1)
more than 75%	-4.9** (-2.8)	-4.4* (-2.6)	-4.4* (-2.5)
Diversity index			
	0.2 (0.8)	0.2 (0.7)	0.2 (0.7)
% of minority students			
	-0.1** (-3.0)	-0.1** (-2.7)	-0.1** (-2.6)
Suburb			
	-1.4 (-1.5)	-1.5 (-1.6)	-1.5 (-1.6)
Town			
	-4.5** (-3.1)	-4.5** (-3.1)	-4.4** (-3.1)
Rural			
	-0.8 (-0.7)	-0.6 (-0.5)	-0.6 (-0.5)

Table H2. Volunteering (continued)

Portions_poverty_zip	-0.1 (-0.9)	-0.1 (-0.6)	-0.1 (-0.6)
Portions_minorities_zip	0.1* (2.5)	0.1* (2.3)	0.1* (2.2)
Female	0.4 (0.5)	0.4 (0.6)	0.4 (0.6)
Age	1.4*** (4.2)	1.4*** (4.3)	1.4*** (4.3)
Age^2	-0.0*** (-4.1)	-0.0*** (-4.3)	-0.0*** (-4.3)
2016	-0.5 (-0.5)	-0.4 (-0.5)	-0.4 (-0.5)
2019	-0.8 (-0.9)	-0.9 (-1.0)	-0.9 (-1.0)
Observations	36,250	36,250	36,250

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Table H3. School Committees

	Model 8	Model 9	Model 10
Black	-2.0* (-2.5)	-2.2** (-2.8)	-2.1** (-2.8)
Hispanic	2.5 (1.7)	2.4 (1.6)	2.4 (1.6)
Asian	-1.8 (-1.6)	-1.7 (-1.5)	-1.6 (-1.4)
Not very well		2.6** (2.9)	2.7** (2.8)
Just okay		2.5*** (4.4)	2.5*** (4.1)
Very well		6.1*** (9.8)	5.9*** (8.5)
Satisfaction index			0.4 (0.8)
U.S. born	1.9 (1.8)	1.8 (1.7)	1.8 (1.8)
B.A. holder	4.1*** (7.7)	4.1*** (7.7)	4.1*** (7.7)
Mostly English	0.5 (0.5)	0.3 (0.3)	0.3 (0.3)
English first language	3.6* (2.4)	3.3* (2.2)	3.3* (2.2)
Single parent	-2.4*** (-3.9)	-2.3*** (-3.7)	-2.3*** (-3.7)

Table H3. School Committees (continued)

Number of siblings	0.9** (3.1)	0.9** (3.1)	0.9** (3.1)
Household income	0.7*** (4.7)	0.7*** (4.8)	0.7*** (4.8)
Government assistance	-0.1 (-0.1)	-0.1 (-0.2)	-0.1 (-0.2)
Expect B.A. for child	3.3*** (4.7)	3.3*** (4.7)	3.3*** (4.8)
Moved for school	1.7* (2.5)	1.5* (2.3)	1.5* (2.3)
Middle school	-1.8** (-3.1)	-1.2* (-2.1)	-1.2* (-2.0)
High school	0.3 (0.4)	1.3 (1.8)	1.4 (1.9)
Below average	1.0 (0.4)	1.0 (0.4)	1.0 (0.3)
Average	3.4 (1.3)	3.4 (1.3)	3.3 (1.2)
Above average	5.2* (2.0)	5.0 (1.8)	4.8 (1.7)
Excellent	7.5** (2.9)	6.7* (2.5)	6.6* (2.4)
ESL enrolled	2.0 (1.1)	1.7 (0.9)	1.6 (0.9)



Table H3. School Committees (continued)

Enrollment size			
Between 300 and 599	-3.4**	-3.2**	-3.2**
	(-3.1)	(-3.0)	(-3.0)
Between 600 and 999	-5.4***	-5.1***	-5.1***
	(-4.7)	(-4.5)	(-4.5)
Between 1,000 and 2,499	-7.3***	-6.9***	-6.9***
	(-6.2)	(-5.9)	(-5.9)
2,500 or more	-7.5***	-7.1***	-7.1***
	(-5.2)	(-5.0)	(-5.0)
School poverty			
25% to 75%	-0.7	-0.5	-0.5
	(-1.2)	(-1.0)	(-1.0)
more than 75%	-0.1	0.0	0.0
	(-0.1)	(0.0)	(0.0)
Diversity index	0.1	0.1	0.1
	(0.8)	(0.7)	(0.7)
% of minority students	0.0	0.0	0.0
	(0.3)	(0.6)	(0.6)
Suburb	-0.3	-0.3	-0.3
	(-0.4)	(-0.5)	(-0.5)
Town	-1.5	-1.4	-1.4
	(-1.2)	(-1.2)	(-1.2)
Rural	0.4	0.5	0.5
	(0.5)	(0.7)	(0.7)

Table H3. School Committees (continued)

Portions_poverty_zip	-0.0 (-0.2)	-0.0 (-0.1)	-0.0 (-0.1)
Portions_minorities_zip	0.0 (1.4)	0.0 (1.1)	0.0 (1.1)
Female	2.2*** (4.7)	2.2*** (4.8)	2.2*** (4.8)
Age	0.7** (2.8)	0.7** (2.9)	0.7** (2.9)
Age^2	-0.0* (-2.4)	-0.0* (-2.5)	-0.0* (-2.5)
2016	-0.4 (-0.7)	-0.4 (-0.7)	-0.4 (-0.7)
2019	-1.7** (-3.0)	-1.7** (-3.1)	-1.7** (-3.1)
Observations	36,250	36,250	36,250

z statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

Table H4. PTO/PTA Meetings

	Model 8	Model 9	Model 10
Black	9.9*** (6.6)	9.2*** (6.1)	9.2*** (6.1)
Hispanic	5.1** (3.2)	4.7** (3.0)	4.7** (3.0)
Asian	-0.2 (-0.1)	-0.4 (-0.2)	-0.5 (-0.2)
Not very well		5.2** (3.2)	5.1** (3.2)
Just okay		10.4*** (8.1)	10.5*** (8.1)
Very well		16.6*** (13.0)	16.8*** (12.3)
Satisfaction index			-0.3 (-0.3)
U.S. born	-5.2** (-3.2)	-5.2** (-3.2)	-5.2** (-3.2)
B.A. holder	1.3 (1.5)	1.2 (1.4)	1.2 (1.4)
Mostly English	3.2 (1.8)	3.1 (1.7)	3.0 (1.7)
English first language	2.6 (1.2)	2.0 (0.9)	2.0 (0.9)
Single parent	-3.4*** (-3.4)	-3.1** (-3.1)	-3.1** (-3.1)

Table H4. PTO/PTA Meetings (continued)

Number of siblings	0.6 (1.5)	0.6 (1.4)	0.6 (1.4)
Household income	-0.1 (-0.2)	-0.0 (-0.1)	-0.0 (-0.1)
Government assistance	1.8 (1.6)	1.8 (1.6)	1.8 (1.6)
Expect B.A. for child	2.2* (2.0)	2.2* (2.1)	2.2* (2.1)
Moved for school	3.8*** (3.8)	3.3*** (3.4)	3.3*** (3.4)
Middle school	-8.4*** (-7.7)	-6.7*** (-6.2)	-6.8*** (-6.2)
High school	-12.6*** (-10.2)	-10.0*** (-8.0)	-10.0*** (-8.0)
Below average	-0.8 (-0.1)	-2.1 (-0.4)	-2.0 (-0.3)
Average	-2.4 (-0.4)	-4.2 (-0.8)	-4.1 (-0.7)
Above average	-2.6 (-0.5)	-5.2 (-0.9)	-5.0 (-0.9)
Excellent	2.4 (0.4)	-1.2 (-0.2)	-1.0 (-0.2)
ESL enrolled	5.6* (2.2)	4.5 (1.8)	4.5 (1.8)

Table H4. PTO/PTA Meetings (continued)

Enrollment size			
Between 300 and 599	-2.7 (-1.5)	-2.3 (-1.3)	-2.3 (-1.3)
Between 600 and 999	-5.1** (-2.8)	-4.3* (-2.5)	-4.3* (-2.5)
Between 1,000 and 2,499	-8.9*** (-4.7)	-8.0*** (-4.2)	-8.0*** (-4.2)
2,500 or more	-11.2*** (-4.3)	-10.4*** (-4.1)	-10.4*** (-4.1)
School poverty			
25% to 75%	-2.3* (-2.3)	-2.1* (-2.0)	-2.1* (-2.0)
more than 75%	0.0 (0.0)	0.4 (0.2)	0.4 (0.2)
Diversity index	0.7*** (3.3)	0.7** (3.2)	0.7** (3.2)
% of minority students	-0.0 (-0.3)	0.0 (0.1)	0.0 (0.1)
Suburb	-0.3 (-0.3)	-0.4 (-0.4)	-0.4 (-0.4)
Town	3.2* (2.0)	3.3* (2.0)	3.3* (2.0)
Rural	-0.8 (-0.6)	-0.5 (-0.4)	-0.5 (-0.4)

Table H4. PTO/PTA Meetings (continued)

Portions_poverty_zip	-0.0 (-0.1)	0.0 (0.1)	0.0 (0.1)
Portions_minorities_zip	0.1* (2.2)	0.1 (1.8)	0.1 (1.8)
Female	-4.0*** (-4.7)	-3.9*** (-4.7)	-3.9*** (-4.7)
Age	0.4 (1.3)	0.4 (1.4)	0.4 (1.4)
Age^2	-0.0 (-0.8)	-0.0 (-1.0)	-0.0 (-1.0)
2016	1.2 (1.2)	1.1 (1.2)	1.1 (1.2)
2019	0.9 (1.0)	0.8 (0.9)	0.8 (0.9)
Observations	36,250	36,250	36,250

z statistics in parentheses  
 \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 Source: NHES 2012, 2016, and 2019

Table H5. Help with Homework

	Model 8	Model 9	Model 10
Black	6.7*** (5.4)	6.5*** (5.3)	6.4*** (5.2)
Hispanic	5.2*** (4.1)	4.7*** (3.8)	4.7*** (3.7)
Asian	2.0 (1.1)	2.0 (1.2)	1.7 (0.9)
Not very well		7.7*** (6.2)	7.9*** (6.3)
Just okay		10.6*** (9.9)	12.0*** (10.8)
Very well		11.9*** (11.1)	14.3*** (12.1)
Satisfaction index			-2.9*** (-4.6)
U.S. born	1.3 (1.0)	1.6 (1.2)	1.6 (1.2)
B.A. holder	2.5*** (3.4)	2.5*** (3.3)	2.5*** (3.3)
Mostly English	4.4** (2.8)	4.5** (2.9)	4.3** (2.7)
English first language	6.0** (3.0)	6.1** (3.1)	5.8** (3.0)
Single parent	-1.5 (-1.7)	-1.4 (-1.6)	-1.4 (-1.6)

Table H5. Help with Homework (continued)

Number of siblings	-0.4 (-1.1)	-0.4 (-1.0)	-0.3 (-0.9)
Household income	-0.8*** (-4.1)	-0.8*** (-4.0)	-0.8*** (-4.0)
Government assistance	-0.5 (-0.5)	-0.5 (-0.5)	-0.5 (-0.5)
Expect B.A. for child	1.4 (1.6)	1.6 (1.8)	1.5 (1.7)
Moved for school	0.2 (0.3)	0.1 (0.1)	0.2 (0.3)
Middle school	-27.2*** (-28.7)	-25.9*** (-27.3)	-26.1*** (-27.5)
High school	-49.5*** (-44.5)	-47.2*** (-40.6)	-47.4*** (-40.7)
Below average	2.2 (0.4)	1.2 (0.3)	2.0 (0.4)
Average	1.5 (0.3)	-0.3 (-0.1)	1.3 (0.3)
Above average	-2.9 (-0.6)	-4.9 (-1.1)	-3.1 (-0.7)
Excellent	-8.2 (-1.7)	-10.4* (-2.3)	-8.4 (-1.8)
ESL enrolled	1.7 (0.8)	1.1 (0.5)	1.1 (0.6)



Table H5. Help with Homework (continued)

Enrollment size			
Between 300 and 599	2.2 (1.4)	2.4 (1.5)	2.5 (1.6)
Between 600 and 999	3.6* (2.3)	3.8* (2.5)	3.9* (2.5)
Between 1,000 and 2,499	1.8 (1.1)	2.3 (1.4)	2.4 (1.5)
2,500 or more	1.8 (0.8)	2.4 (1.1)	2.5 (1.2)
School poverty			
25% to 75%	0.6 (0.7)	0.8 (1.0)	0.7 (0.8)
more than 75%	2.2 (1.3)	2.4 (1.4)	2.2 (1.3)
Diversity index			
	0.3 (1.6)	0.3 (1.7)	0.3 (1.6)
% of minority students			
	0.0 (0.1)	0.0 (0.3)	-0.0 (-0.0)
Suburb			
	1.0 (1.1)	0.9 (1.1)	0.9 (1.0)
Town			
	0.5 (0.4)	0.6 (0.5)	0.5 (0.4)
Rural			
	0.6 (0.6)	0.8 (0.7)	0.6 (0.5)

Table H5. Help with Homework (continued)

Portions_poverty_zip	0.0 (0.1)	0.0 (0.2)	0.0 (0.1)
Portions_minorities_zip	0.0 (1.2)	0.0 (1.1)	0.0 (1.3)
Female	-5.0*** (-7.4)	-4.5*** (-6.7)	-4.5*** (-6.7)
Age	-0.5 (-1.7)	-0.5 (-1.7)	-0.5 (-1.8)
Age^2	0.0 (0.7)	0.0 (0.8)	0.0 (0.8)
2016	-1.4 (-1.7)	-1.4 (-1.8)	-1.4 (-1.7)
2019	-5.5*** (-7.0)	-5.7*** (-7.3)	-5.6*** (-7.1)
	34,500	34,500	34,500

*z* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source: NHES 2012, 2016, and 2019

## Appendix I. Chapter 5.1. - Additional Sub-Group Analyses

Table II. Racial Gaps by Schools' Information Provision

School provides information	Parent-teacher conferences		Volunteering		School committee	
		Very well		Very well		Very well
Black	0.7 (0.4)	3.7* (2.4)	-3.1 (-1.9)	-7.0** (-3.1)	-1.4 (-1.8)	-3.2* (-2.3)
Hispanic	1.1 (0.6)	3.3* (2.1)	3.4* (2.0)	-3.2 (-1.3)	2.6 (1.8)	2.2 (0.8)
Asian	-0.2 (-0.1)	-2.9 (-1.1)	-0.8 (-0.4)	-7.8** (-2.7)	1.1 (0.7)	-5.4** (-3.2)
<i>Observations</i>	21,380	14,870	21,380	14,870	21,380	14,870

*z* statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ;

Source: NHES 2012, 2016, and 2019

\*(1: Very Well 0: Otherwise)

## Appendix J. Chapter 5.1. - Logit Regressions with Interaction Terms

Table J1. Logit Coefficients: Race\*Providing Information (1: Yes)

	Parent-teacher conferences		Volunteering		School committee	
		Interaction terms		Interaction terms		Interaction terms
Black	0.14 (1.86)	0.07 (0.66)	-0.24*** (-3.38)	-0.28* (-2.01)	-0.25* (-2.53)	-0.35 (-1.67)
Hispanic	0.12 (1.51)	-0.07 (-0.66)	0.02 (0.23)	-0.19 (-1.55)	0.25 (1.73)	0.16 (0.63)
Asian	-0.11 (-1.15)	-0.13 (-0.78)	-0.23* (-2.43)	-0.14 (-0.72)	-0.23 (-1.59)	-0.06 (-0.14)
Provides Info	0.60*** (14.43)	0.53*** (10.81)	0.58*** (13.26)	0.53*** (10.55)	0.41*** (6.06)	0.38*** (5.46)
Black*Info		0.10 (0.71)		0.05 (0.35)		0.12 (0.53)
Hispanic*info		0.27* (2.31)		0.25* (2.00)		0.11 (0.46)
Asian*info		0.03 (0.18)		-0.09 (-0.43)		-0.19 (-0.44)
Observations	36,250	36,250	36,250	36,250	36,250	36,250

*z* statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Source: NHES 2012, 2016, and 2019

## Appendix K. Chapter 5.2. – Summary Statistics (Sub-Sample)

Table K1. Descriptive Statistics - Sub Sample

	2012 (%)	2016 (%)	2019 (%)
White	7	6	9
Black	5	3	5
Hispanic	72	76	72
Asian	17	15	15
US-born	10	5	11
B.A. holder	18	17	19
Very difficult	13	17	13
Somewhat difficult	38	40	43
Not at all difficult	49	43	45
Government aid	52	54	50
Household income (mean)	4.6	4.7	5.2
Single parent	24	21	20
Number of siblings (mean)	1.6	1.7	1.7
Child ESL enrolled	23	27	30
Female	68	72	64
Age (mean)	40.6	41.3	43.1
Expect child BA degree	79	80	72
<u>Attending grade</u>			
Elementary	51	48	42
Middle	23	24	23
High	26	28	35
Failing	0	0	0
Below Average	3	2	4
Average	35	35	32
Above average	26	27	29
Excellent	36	35	35
Racial diversity	0.5	0.4	0.5
Portion of minorities (mean)	60	62	62
<u>Enrollment size</u>			
Under 300	4	4	4
Between 300 and 599	29	24	25
Between 600 and 999	36	36	33
Between 1,000 and 2,499	26	29	29
2,500 or more	5	7	8
<u>School poverty</u>			
Under 25%	24	12	13
25% to 75%	45	44	46
More than 75%	32	44	41
<i>Observations</i>		4,460	

Source: NHES 2012, 2016, and 2019

## Appendix L. Chapter 5.2. - Proportion Test

Table L1. Difficulty to Participate due to Language Barriers (%)

	Hispanic	Asian
2012	58	37
2016	60	54
2019	64	46

Source: NHES 2012, 2016, 2019

## Appendix M. Chapter 5.2. – Bivariate Regressions

Table M1. Coproduction by Level of Language Barriers

	PT conferences	Volunteering	School committees	PTO meetings
Somewhat difficult	6.4 (1.6)	-2.9 (-0.9)	0.7 (0.4)	0.0 (0.0)
Not at all difficult	9.8** (2.7)	11.2*** (3.4)	3.4 (1.8)	3.0 (0.7)
Observations	4,460	4,460	4,460	4,460

z statistics in parentheses

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012, 2016, and 2019

Table M2. Government Initiatives for Language Barriers: All Parents

	Translated written materials	Interpreters at meetings
Hispanic	55.3*** (13.8)	54.4*** (14.4)
2016	0.5 (0.2)	2.2 (0.9)
2019	3.5 (1.6)	4.2* (2.2)
2012 Asian	27.4	27.4
<i>Observations</i>	3,960	3,960

z statistics in parentheses; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001  
Source: NHES 2012, 2016, and 2019

Table M3. Government Initiatives for Language Barriers: Parents (LangDiff=1)

	Translated materials	Interpreters
Hispanic	44.2*** (6.4)	43.2*** (7.1)
2016.year	2.0 (0.5)	3.6 (1.2)
2019.year	4.4 (1.5)	3.0 (1.1)
Asian in 2012	26	36
<i>Observations</i>	2,080	2,080

z statistics in parentheses  
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001  
Source: NHES 2012, 2016, and 2019

Table M4. Assistance with Language Barriers by Race

	Translated materials	Interpreters
Hispanic	44.2*** (6.4)	43.2*** (7.1)
2016	2.0 (0.5)	3.6 (1.2)
2019	4.4 (1.5)	3.0 (1.1)
Asian in 2012	26	36
Observations	2,080	2,080

z statistics in parentheses

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012, 2016, and 2019

\*\*only for parents who reported they have difficulties due to language barriers

## Appendix N. Chapter 5.2. - Logit Regressions with Interaction Terms

Table N1. Providing Translated Materials: Interaction Terms

	Parent-teacher conferences		Volunteering		School committee	
Translated materials	-0.05 (-0.29)	-0.16 (-0.84)	-0.32 (-1.46)	-0.03 (-0.13)	0.56* (2.02)	0.80 (1.93)
Language difficulty	-0.12 (-0.93)	-0.26 (-1.19)	-0.71*** (-5.23)	-0.29 (-1.07)	-0.47* (-2.17)	-0.07 (-0.16)
Translated*difficulty		0.19 (0.76)		-0.58 (-1.95)		-0.47 (-0.97)
Newsletter	0.51** (3.07)	0.52** (3.13)	0.52** (2.68)	0.49** (2.60)	-0.19 (-0.67)	-0.20 (-0.71)
Hispanic	0.06 (0.30)	0.07 (0.36)	-0.08 (-0.36)	-0.12 (-0.54)	0.03 (0.08)	-0.01 (-0.04)
B.A. holder	0.53*** (3.34)	0.52** (3.19)	0.21 (1.28)	0.25 (1.53)	0.07 (0.25)	0.10 (0.35)
Household income	-0.03 (-0.84)	-0.03 (-0.89)	0.05 (1.34)	0.05 (1.51)	0.05 (0.93)	0.05 (1.00)
Government aid	0.08 (0.55)	0.07 (0.53)	0.13 (0.81)	0.14 (0.88)	-0.08 (-0.32)	-0.07 (-0.30)
Single parent	0.04 (0.25)	0.04 (0.24)	-0.06 (-0.35)	-0.06 (-0.35)	-0.30 (-1.28)	-0.30 (-1.28)
Number of siblings	0.04 (0.59)	0.04 (0.60)	0.05 (0.75)	0.05 (0.72)	0.04 (0.42)	0.04 (0.40)
Expect B.A. for child	-0.04 (-0.69)	-0.04 (-0.68)	0.12 (1.77)	0.12 (1.74)	0.26** (2.75)	0.26** (2.74)
Moved for school	-0.25 (-1.61)	-0.26 (-1.63)	0.16 (1.08)	0.16 (1.09)	0.01 (0.04)	0.02 (0.06)
Middle	-0.83*** (-4.56)	-0.83*** (-4.56)	-0.84*** (-4.70)	-0.85*** (-4.81)	0.24 (0.88)	0.23 (0.85)
High	-1.35*** (-6.96)	-1.35*** (-6.95)	-0.61* (-2.45)	-0.62* (-2.55)	0.04 (0.14)	0.03 (0.09)



Table N1. Providing Translated Materials: Interaction Terms (continued)

Racial diversity	-0.30 (-0.97)	-0.31 (-1.00)	0.75* (2.17)	0.79* (2.29)	0.66 (1.44)	0.68 (1.49)
25% to 75%	-0.11 (-0.72)	-0.10 (-0.70)	-0.26 (-1.62)	-0.27 (-1.66)	0.16 (0.55)	0.15 (0.53)
More than 75%	-0.22 (-1.34)	-0.22 (-1.31)	0.03 (0.14)	0.02 (0.09)	0.51 (1.69)	0.50 (1.63)
Between 300 and 599	-0.38 (-1.09)	-0.38 (-1.08)	0.12 (0.31)	0.10 (0.28)	-0.24 (-0.45)	-0.25 (-0.47)
Between 600 and 999	-0.51 (-1.50)	-0.51 (-1.49)	-0.02 (-0.05)	-0.03 (-0.07)	-0.26 (-0.50)	-0.26 (-0.51)
1,000 and 2,499	-0.91** (-2.77)	-0.92** (-2.77)	-0.11 (-0.30)	-0.12 (-0.33)	-0.59 (-1.07)	-0.60 (-1.08)
2,500 or more	-1.03** (-2.70)	-1.02** (-2.68)	0.12 (0.27)	0.08 (0.19)	-0.40 (-0.62)	-0.41 (-0.64)
U.S. born	-0.31 (-1.15)	-0.30 (-1.13)	0.04 (0.16)	0.02 (0.07)	-0.67 (-1.65)	-0.69 (-1.68)
Female	0.12 (0.95)	0.12 (0.97)	0.15 (1.12)	0.15 (1.08)	0.22 (1.04)	0.21 (1.03)
Age	0.01 (0.15)	0.01 (0.16)	-0.00 (-0.01)	-0.00 (-0.05)	-0.09 (-1.07)	-0.09 (-1.07)
Age <sup>2</sup>	-0.00 (-0.10)	-0.00 (-0.11)	0.00 (0.07)	0.00 (0.09)	0.00 (1.02)	0.00 (1.02)
2016	0.18 (1.22)	0.18 (1.22)	0.10 (0.66)	0.10 (0.67)	0.06 (0.27)	0.06 (0.27)
2019	0.17 (1.09)	0.17 (1.09)	0.31* (2.03)	0.31* (2.01)	0.10 (0.48)	0.10 (0.48)
Constant	1.74 (1.44)	1.79 (1.48)	-2.43 (-1.66)	-2.54 (-1.72)	-2.84 (-1.33)	-2.97 (-1.40)
<i>Observations</i>	3,960	3,960	3,960	3,960	3,960	3,960

z statistics in parentheses

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012, 2016, and 2019

Table N2. Providing Interpreters: Interaction Terms

	Parent-teacher conferences		School committee	
Interpreter	0.02 (0.12)	-0.10 (-0.56)	0.67** (2.63)	0.99** (2.67)
Language difficulty	-0.13 (-1.02)	-0.28 (-1.49)	-0.49* (-2.26)	0.17 (0.42)
Interpreter*difficulty		0.20 (0.89)		-0.76 (-1.73)
Hispanic	0.08 (0.46)	0.08 (0.48)	-0.00 (-0.02)	-0.03 (-0.11)
B.A. holder	0.57*** (3.60)	0.55*** (3.44)	0.11 (0.40)	0.15 (0.56)
Household income	-0.02 (-0.77)	-0.03 (-0.82)	0.05 (0.95)	0.06 (1.06)
Government aid	0.06 (0.41)	0.05 (0.39)	-0.10 (-0.40)	-0.08 (-0.35)
Single parent	0.02 (0.14)	0.02 (0.14)	-0.30 (-1.29)	-0.31 (-1.34)
Number of siblings	0.02 (0.40)	0.02 (0.39)	0.04 (0.37)	0.04 (0.40)
Expect B.A. for child	-0.03 (-0.56)	-0.03 (-0.55)	0.26** (2.70)	0.26** (2.71)
Moved for school	-0.24 (-1.51)	-0.23 (-1.49)	-0.00 (-0.02)	-0.01 (-0.04)
Middle	-0.84*** (-4.60)	-0.84*** (-4.58)	0.21 (0.77)	0.20 (0.73)
High	-1.37*** (-7.09)	-1.37*** (-7.10)	0.01 (0.05)	0.01 (0.04)
Racial diversity	-0.37 (-1.23)	-0.37 (-1.23)	0.72 (1.56)	0.73 (1.59)

Table N2. Providing Interpreters: Interaction Terms (continued)

<u>School Poverty</u>				
25% to 75%	-0.17 (-1.12)	-0.16 (-1.10)	0.15 (0.54)	0.14 (0.50)
More than 75%	-0.25 (-1.55)	-0.25 (-1.53)	0.50 (1.68)	0.49 (1.62)
Between 300 and 599	-0.39 (-1.13)	-0.39 (-1.12)	-0.17 (-0.32)	-0.19 (-0.36)
Between 600 and 999	-0.51 (-1.53)	-0.51 (-1.53)	-0.18 (-0.35)	-0.19 (-0.36)
1,000 and 2,499	-0.94** (-2.90)	-0.94** (-2.90)	-0.49 (-0.89)	-0.50 (-0.92)
2,500 or more	-1.07** (-2.87)	-1.06** (-2.85)	-0.30 (-0.47)	-0.33 (-0.52)
U.S. born	-0.30 (-1.11)	-0.29 (-1.08)	-0.67 (-1.63)	-0.70 (-1.70)
Female	0.11 (0.93)	0.11 (0.94)	0.21 (1.02)	0.21 (1.02)
Age	0.01 (0.23)	0.01 (0.26)	-0.09 (-1.14)	-0.10 (-1.18)
Age <sup>2</sup>	-0.00 (-0.19)	-0.00 (-0.21)	0.00 (1.10)	0.00 (1.13)
2016	0.19 (1.29)	0.19 (1.29)	0.05 (0.24)	0.06 (0.26)
2019	0.16 (1.03)	0.16 (1.03)	0.11 (0.49)	0.10 (0.49)
Constant	2.08 (1.74)	2.12 (1.77)	-3.03 (-1.44)	-3.18 (-1.51)
<i>Observations</i>	3,960	3,960	3,960	3,960

z statistics in parentheses

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: NHES 2012, 2016, and 2019

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## **Vita**

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