

**EXPLORING THE AUTONOMOUS ECONOMIC WORLD OF CHILDREN:
A MIXED METHODS STUDY OF KIDS' NAÏVE ECONOMIC THEORIES
INCORPORATING ETHNOGRAPHIC AND BEHAVIORAL ECONOMICS
METHODOLOGIES**

by

Amanda Brooke Jennings

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economic Education

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ABSTRACT

Children construct meaning from their economic experiences in the form of naïve theories and use these theories to explain the relationships between their actions and the outcomes. Inevitably, due to their lack of economic literacy, these theories will be incomplete. Through curriculum design that acknowledges and addresses these naïve theories, we can help children develop theories consistent with expert theories. As a first step, however, we need to understand what children's naïve economic theories look like, and what factors inform their development. My dissertation is an investigation of children's naïve economic theories about resource allocation. In this multiphase, mixed methods study, there are two overlapping phases conducted over one academic year: in Phase 1, I utilized ethnographic methods to develop an initial model of children's naïve theory of resource allocation; in Phase 2, I used adaptations of classic experimental economics games to test and revise my initial model. In this study I find children's naïve economic theories are based on their experiences allocating resources in their own economic world. Additionally, when children participate in the adult economic world, they apply these same rules for resource allocation. These findings about children's naïve economic theories have implications for future research as well as curriculum development in economic education. Through understanding children's current thinking, we can better design curriculum to guide naïve theory development to be consistent with expert economic theory.

Chapter 1

INTRODUCTION AND LITERATURE REVIEW

“The challenge for teaching [economics] is finding ways to develop learning that will impact on the way in which young people perceive, participate in, and change the economy.”

(Davies, Howie, Managan & Telhaj, 2002)

Introduction

We live in a world filled with economic problems. This isn't an adults-only world, this is a world inhabited by children too. Children experience our economic world as soon as they face a choice and experience the opportunity cost of that choice (Meszaros & Evans, 2010). They construct meaning from this experience, and create models that explain their experience. These models will inevitably be incomplete representations, a result of their lack of knowledge and their lack of economic literacy (Davies, Howie, Managan & Telhaj, 2002).

As children grow, their experiences in the economic world grow more complex, requiring them to construct more complex explanations. However, without education, these explanations will still be incomplete; they will represent naïve thinking. In order for children's thinking to progress from naïve thinking to expert thinking, they need education (Davies & Lundholm, 2012; Leiser & Halachemi, 2006).

Since their exposure to the economic world occurs at a young age, it follows then that we have an opportunity and responsibility to help them at a young age to

construct accurate models that explain the economic world (Meszaros & Evans, 2010; Schug, 1981). Although these first models will be simplistic and incomplete, they will become a base for more complex and complete models later on. When economics is introduced early in the curriculum, students learn accurate ways of viewing the economic world that can be developed throughout their lives resulting in a population of economically literate adults (Meszaros & Evans, 2010).

The success of our democratic society is dependent upon the participation of its citizens (Davies, Howie, Managan & Telhaj, 2002; Stigler, 1970; Tobin, 1986). We ask citizens to serve in our government and to make decisions about who should be elected, therefore we need our citizens to be educated. Not only do they need to be literate in English and math, but also in economics. Economic literacy is necessary for our country's citizens to accurately analyze the impacts of trade policies, and taxes, and the federal debt (Davies, Howie, Managan, & Telhaj, 2002; Tobin, 1986). Without economic literacy, we are left to rely on partisan spokespersons whose messages are not designed to educate, but to persuade (Stigler, 1970). When we empower people with economic literacy, we empower them to understand the issue at hand. With economic literacy, they have the framework to analyze a situation, and based on their goals and priorities, make an informed decision.

Should economic literacy be included as part of K-12 curriculum? We must first ask, "What is the goal of education? What is the purpose of having students sit in classrooms from the time they are five years old until they are eighteen?" Labaree (2010) proposes three goals for education in the United States' education system. The first goal is an educated citizenry in order to ensure a strong democracy. The second goal is preparing all students with the basic skills and knowledge they need to

contribute to our society. The third goal is providing the skills and knowledge that students can use to differentiate themselves, to fulfill the American Dream. I argue that whichever of these goals you believe our education system is designed to achieve, economic literacy is not only important, but also an essential component of the curriculum.

My dissertation addresses how we can achieve economic literacy through the K-12 education system. I begin with a review of the literature focusing on what we know about the development of economic thinking in children and opportunities for new theoretical and methodological approaches. Following the literature review, in Chapter 2, I describe my mixed methods approach to investigating children's naïve theories about resource allocation¹. Next, in Chapter 3, I describe methods, analysis, and results from Phase 1: An Ethnographic Exploration of Children's Autonomous Economic Systems. In Chapters 4 and 5, I describe the methods, analysis, and results from the two sub-studies of Phase 2: An Experimental Economics Approach to Children's Choices and Behaviors. I conclude in Chapter 6 with a discussion merging findings from Phases 1 and 2.

Literature Review

I begin my review of the literature by examining how economic literacy has been defined historically, and operationalizing economic literacy with respect to this

¹ Although economic education literature distinguishes between resources, items used to produce goods and services, and goods, items that satisfy wants, I will not distinguish between resources and goods in this study for two reasons. First, in Phase 1 of this study, I am interested in how children classify items over which they have control, and the allocation decisions they make with respect to those items. As children's allocation decisions do not seem to reflect this distinction, I have chosen not to distinguish between goods and resources. Second, in Phase 2 of this study, I have taken an experimental economics approach utilizing incentives within an experimental framework to act as proxies for incentives in children's natural settings. As the incentives selected are proxies, I refer to all incentives within the experimental frameworks as resources.

study. Then, I trace the development of economic education curriculum in response to concerns about low levels of economic literacy in the United States. Next, I describe opportunities to re-examine existing curriculum from a socio-constructivist learning theory perspective and a naïve theory framework. Following this, I describe the historical investigation of children’s thinking about economics from the 1950s through the present. Finally, I describe how, through a socio-developmental approach and a naïve theory framework, we can deepen our understanding of children’s naïve theories about resource allocation, providing impetus for the current study.

Historical Definitions of Economic Literacy

Hansen (1982) claims the term economic literacy first entered our national vocabulary as a result of the 1961 National Task Force on Economic Education Report (*Report*) published by the Joint Council on Economic Education (JCEE) now known as the Council for Economic Education (CEE). A review of the economic education literature since the 1961 *Report* reveals that while many authors use the term to discuss the importance of, the current state of, or a method to improve economic literacy, few authors define what is meant by economic literacy. When authors do provide a definition, these definitions vary across two dimensions: first, in the role assumed by the economically literate person; second, in the action the economically literate person should be able to demonstrate. I establish the definition of economic literacy used in this study by summarizing nine definitions from the literature, identifying the similarities and differences among the definitions, and explaining the rationale for the definition of economic literacy that informs this study.

Hansen (1982) attributes the first definition of economic literacy to the *Report*. The *Report* defines economic literacy as “economic knowledge necessary for effective

citizenship by the average high school graduate.” Nine years after the *Report*, in the first volume of *The Journal of Economic Education*, economist George Stigler defines economic literacy in his seminal essay on the need for economic literacy in school curriculum. He defines economic literacy as, “knowledge of the theories which are held by the professional economists” and refers to his definition as the authoritative definition (1970).

Although Stigler believes his definition to be authoritative, Hansen, in remarks to the 1976 National Conference on Needed Research and Development in Economic Education, offers a different definition shifting the focus from knowing to applying. He defines economic literacy as not only “a substantive knowledge of economics” but also “obtaining an overall perspective on the economic system and...applying a reasoned or rational approach in thinking about economic issues” (Hansen, 1976). He extends Stigler’s definition and calls for high school graduates to be able to apply economic reasoning, not just know economic theories.

The Master Curriculum Guide in Economics for the Nation’s Schools, published in 1977 by the JCEE, provided a framework and strategies for teaching economics at the pre-college levels (Hansen, Bach, Calderwood & Saunders, 1977). In Part 1 of the Master Curriculum Guide, the authors define economic literacy, and differentiate the definition based on role: consumer, worker, and citizen voter. Economic literacy looks different for each of the roles: economically literate consumers achieve consumer satisfaction given limited resources; economically literate workers make decisions about income earning opportunities; and economically literate citizen voters participate in public debate about economic issues.

Hansen, who was involved in writing both the Report and the Master Curriculum Guide, offers a revision to the idea of economic literacy in his 1982 chapter “Are Americans Economically Literate?”. Hansen expresses his concern about the term economic literacy because it implies a dichotomy of literate or not, and suggests instead that we consider a continuum of economic thinking from “folk” thinking to more “elaborate” thinking. He associates “folk” thinking with that of ordinary citizens and “elaborate” thinking with economics experts. On this continuum, citizens develop economic understanding with respect to knowing about economic institutions, analyzing economic problems, and weighing alternatives to economic problems.

In 1986 in a Wall Street Journal editorial, economist James Tobin presents an argument for economic literacy designed to appeal to a wide audience. Similarly to the authors of the Master Curriculum Guide, Tobin identifies roles in which economic literacy is essential. He asserts that economic literacy is a framework for breadwinners, citizens, consumers, and voters to “think about economic problems and choices” (Tobin, 1986).

In 1996 the CEE published the National Voluntary Content Standards in Economics (the *Standards*) to “not only assist them [teachers] by suggesting what is important to teach at various grade levels, but also give examples of lessons that help students meet each standard” (Siegfried & Meszaros, 1997). In the forward to the *Standards*, the writing committee defines economic literacy as the ability for high school graduates to reason about economics and to deduce conclusions about economic problems. This is achieved through understanding of the *Standards* (CEE, 1996). The *Standards* were revised in 2010, but the definition in the forward remains

the same (CEE, 2010). Siegfried and Meszaros (1997) further clarify the definition of economic literacy by identifying the roles in which high school graduates will demonstrate economic literacy: citizens, workers, and life-long learners.

Salemi (2005) extends the definition of economic literacy presented in the *Standards* to students enrolled in principles of economics courses at the college level. He argues that economic literacy is attained if students can “apply economic concepts years later, in situations relevant to their lives and different from those encountered in the classroom”. He also reiterates the language from the *Standards* by stating that this can be operationalized as students having an understanding of the *Standards*.

While the *Standards* apply to education in the United States, Davies, Howie, Managan, and Telhaj (2002), in response to newly mandated citizenship education in British public schools, provide a definition for economic literacy for all citizens in democracies. In this definition, economically literate citizens perceive the economy, evaluate arguments to resolve economic problems, and change the economy. This definition is the most explicit in calling for economically literate individuals to effect change as opposed to acting within existing economic institutions.

Analysis of Historical Definitions

These definitions vary in the role of the economically literate individual as well as the action the economically literate individual is expected to perform. Table 1 provides an overview of my analysis. Column 1 provides the definition’s source. Column 2 identifies the economically literate individual’s role. Column 3 identifies the action demonstrated by the individual. Finally, column four identifies whether the benefit of economic literacy is public or private.

While some definitions refer to the workers or breadwinners (Hansen, Bach, Calderwood & Saunders, 1977; Siegfried & Meszaros, 1997; Tobin, 1986), others refer to consumers (Hansen, Bach, Calderwood & Saunders, 1977; Tobin 1986), life-long learners (Siegfried & Meszaros, 1997), and college and high school students (Salemi, 2005; Hansen, 1976; CEE, 1996). The roles of consumer, worker, and student are individual roles in which economic literacy has personal benefits. However, five of the nine definitions identify “citizen” as the role of the economically literate individual (Hansen, Bach, Calderwood & Saunders, 1977; Hansen, 1982; Davies, Howie, Managan, Telhaj, 2002; Siegfried & Meszaros, 1997; Tobin, 1986). The role of citizen implies a group role and therefore the public benefits of economic literacy. When we examine the actions an economically literate individual should be able to perform, these personal (or private) and public benefits are evident.

Private benefits of economic literacy arise when individuals achieve consumer satisfaction (Hansen, Bach, Calderwood & Saunders, 1977), decide about income earning opportunities (Hansen, Bach, Calderwood & Saunders, 1977), and when they approach economic problems that affect them as consumers and workers (CEE, 1996; Hansen, 1976; Hansen, Bach, Calderwood & Saunders, 1977; Siegfried & Meszaros, 1997; Salemi, 2005; Tobin, 1986). Public benefits of economic literacy arise when citizens participate in public debates about economic issues (Hansen, Bach, Calderwood & Saunders, 1977), evaluate arguments to resolve economic problems (Davies, Howie, Managan, Telhaj, 2002; Hansen 1982), and act to change the economy (Hansen, Bach, Calderwood & Saunders, 1977; Hansen, 1982; Davies, Howie, Managan, Telhaj, 2002; Siegfried & Meszaros, 1997; Tobin, 1986).

Table 1 Analysis of nine “economic literacy” definitions

Source for Economic Literacy Definition	Role of the Economically Literate Individual	Action demonstrated by an economically literate individual	Benefit of Economic Literacy
Stigler 1970	Not Specified	Know theories held by professional economists	Private
Hansen 1976	High School Graduate	Apply a reasoned & rational approach in thinking about economic issues	Private
Hansen, Bach, Calderwood, Saunders 1977	Consumer	Achieve consumer satisfaction given limited resources	Private
	Worker	Decide about income earning opportunities	
	Citizen Voter	Participate in public debate on economic issues	
Hansen 1982	Citizens	Analyze economic problems Know economic institutions Weigh alternatives to economic problems	Public
Tobin 1986	Breadwinners Consumers	Think about economic problems	Private
	Citizens Voters	Think about economic problems	Public
CEE 1996	High School Graduate	Reason about economics Deduce conclusions about economic problems	Private
Siegfried & Meszaros 1997	Learner Worker	Understand economic standards	Private
	Citizens	Understand economic standards	Public
Davies, Howie, Managan, Telhaj 2002	Citizens	Perceive the economy Evaluate arguments to resolve economic problems Change the economy	Public
Salemi 2005	College Student	Apply economic concepts	Private

6

Definition of economic literacy guiding this study

I conceptualize economic literacy as a continuum of economic understanding from naïve to expert through which citizens perceive, participate in, and effect change in our economic system. My definition draws on Hansen's (1982) perspective of economic understanding as a continuum rather than a dichotomous achievement. I prioritize the public benefits of economic literacy by identifying the role of "citizen" as the economically literate individual, but also acknowledge the private benefits by incorporating *participation in the economic system* as this includes, but is not limited to, the individual's role as consumer and producer. I use Davies, Howie, Managan, & Telhaj's (2002) framework to provide the overarching context for how economic literacy is enacted. *Perceiving the economic system* captures citizens' knowledge of the economic system including causes and effects of economic events. *Participating in the economy* captures citizens' activities as consumers and producers. Finally, effecting change in the economy captures citizens reasoning about economic problems, evaluation of solutions, and actions in response to economic problems. This definition, with its focus on the role of citizens and a continuum of economic understanding, serves as a context and motivation for my exploration of children's naïve understandings of economics as a means to improve economic literacy. By uncovering children's naïve understanding, we can design instruction that moves children along the continuum toward expert understanding and thus increases economic literacy in our society.

Economic Education Curriculum and the National Voluntary Content Standards

The Council for Economic Education is the leading organization in the United States dedicated to economic and financial literacy education for students in kindergarten through high school (CEE, 2015a). Last year the CEE reached 55,000 educators in all fifty states (CEE, 2015b). The CEE's goal is "to reach and teach every child to create a more informed citizenry capable of making better decisions as savers, investors, borrowers, voters, and participants in the global economy" (CEE Website). To this end, the CEE developed and published the National Voluntary Content Standards in Economics (the Standards) in 1996, which were revised in 2010 (MacDonald & Siegfried, 2012). The Standards were developed to aid economic instruction in K-12 classrooms after the Goals 2000 Educate America Act included economics as a subject area (Siegfried & Meszaros, 1998).

Influence of the Standards

The Standards, while voluntary, form the basis of economics curriculum and assessment in the United States. All curriculum materials published by the CEE are aligned with the Standards and grade level benchmarks (MacDonald & Siegfried, 2012). The Standards frame the content and questions of the National Assessment of Educational Progress (NAEP) in Economics (NAGB, 2012). The NAEP is used to measure the economic achievement of twelfth grade students, and to compare achievement across time. In addition to the NAEP, the Basic Economics Test (BET), Test of Economic Knowledge (TEK), and Test of Economic Literacy (TEL), are all nationally normed measures of economic understanding at the late elementary, middle school, and high school levels respectively, and their content is based on the Standards (Walstad, Rebeck & Butters, 2010a; Walstad, Rebeck & Butters, 2010b; Walstad,

Rebeck & Butters, 2013). Classroom teachers as well as researchers use these assessments to measure growth and achievement of economic understanding. The standards form the foundation of economics instruction and assessment in the United States, and their development grew out of a desire to facilitate the inclusion of economics in the K-12 curriculum.

Development of the Standards

In response to the 1994 Goals 2000 Educate America Act, the CEE formed a coalition to write the standards (Siegfried & Meszaros, 1998). The coalition established a writing committee composed of economists, researchers in economic education, and teachers. Outside reviewers, including teachers, researchers, and economists, reviewed several drafts, and an outside panel of economists reviewed an intermediate draft for accuracy of economic content. Siegfried and Meszaros, chair and project director respectively, report that the standards each represent an economic principle that is essential to economic understanding and that each standard also has a statement of what a student should be able to do when they have mastered the standard (Siegfried & Meszaros, 1998). The standards represent achievement at the end of high school, so the writing committee identified benchmarks for each standard at the fourth, eighth, and twelfth grade levels. The benchmarks “become increasingly complex, building upon knowledge that students gain at the previous grade levels...the benchmarks develop the economic reasoning behind the standard” (Siegfried & Meszaros, 1998). CEE lessons and curriculum packages are aligned with these benchmarks in an effort to assist teachers in implementing the standards in their classrooms.

Limitations of the Standards and opportunities

The standards represent “the most important and enduring ideas and concepts” of economics (Siegfried & Meszaros, & 1998). The principles in the standards have been affirmed by a consensus of economists as accurate and essential to economic understanding (MacDonald & Siegfried, 2012). However, there is an opportunity to apply this same rigorous review process to the benchmarks. While the authors state that the benchmarks are “presented in a sequential order at appropriate grade levels” they do not provide evidence from learning theory literature or child development literature to support their sequence or appropriateness (Siegfried & Meszaros, 1998). Specifically, we should consider what content should be introduced at each level, and how we should scaffold the benchmarks to ensure that students can achieve mastery of the standards upon graduation from high school. Socio-constructivist learning theory provides a context for addressing this opportunity in the benchmarks.

Socio-constructivist learning theory

Socio-constructivist learning theory acknowledges the roles of the learner and the learner’s social context in constructing learning. Jean Piaget asserted children construct knowledge based on experiences, either through assimilation or accommodation. Assimilation occurs when a new experience fits within existing knowledge or beliefs and accommodation occurs when learners develop a new way of thinking as a result of the experience. It is through the combination of assimilation and accommodation that children construct new learning (Piaget, 1977). Lev Vygotsky’s theory of learning also asserts the construction of knowledge but emphasizes that individuals create knowledge as a way of making sense of shared experiences (Murphy, 2012). For Piaget, cognitive development is linear and drives what children

are able to learn and when they are able to learn it. For Vygotsky, social and cultural contexts, including interactions with adults and peers, drive learning; therefore, children learn in response to external factors, not just internal developmental factors. Children construct new knowledge based on what they already know, therefore instruction should begin with what children already know and believe.

Naïve theories

Children organize what they know and believe into theory-like systems called naïve theories (Wellman & Gelman, 1998). Children use naïve theories to “explain, interpret and make predictions about the world” within specific domains (Wellman & Gelman 1998). While these theories are resistant to change, theories can be restructured. This process is similar to scientific revolutions observed throughout history. A child, like a scientist, restructures a theory when the theory no longer accurately predicts outcomes. Unlike scientists, however, children do not systematically test their theories. While children do not explicitly test their theories, they implicitly test their theories each time they use a theory to predict what will happen next, or try to explain something that happened. Naïve theories have explanatory power, otherwise children would restructure the theory. However, theories are often incomplete or inaccurate when extended to a broader context. For example, in mathematics, children may theorize that the more digits in a number, the larger the number. This theory works for whole numbers: 341 is larger than 34. However, this theory will not always be accurate when applied to numbers with decimals. For example, the theory will produce the correct answer when comparing 3.41 to 3.4, but not when comparing 3.41 with 3.5. In this example, the naïve theory is a result of both the child’s lived experience (informal learning) and their math instruction (formal

learning) (Smith, diSessa, & Roschelle, 1994). Vosniadou (2013) explains the curricular implications for naïve theories that have been productive for students in the past, but are no longer resulting in accurate predictions.

From naïve theories to expert theories

Vosniadou researches conceptual change, or restructuring of naïve theories, in both mathematics and science contexts (2013). She explains that when instruction does not address students' theories, the result is either fragmentation or the formation of synthetic models. Fragmentation occurs when children add a new piece of information to their theory, but the information is inconsistent. Children can recall the new information; however, they will not incorporate it into their naïve theory. Synthetic models are a combination of the child's naïve theory and the new information; however, the new information is distorted to fit into their naïve theory. Both fragmentation and synthetic models are problematic because they do not represent more expert-like theory development. An example of this type of fragmentation and synthetic model development can be seen in a lesson about the shape of the earth. If you show children a globe and tell them it is a model of the earth, this does not take into account their naïve theories that the earth is flat, or that gravity pulls objects down (i.e. people on the side of the earth would fall off). Vosniadou reports that telling students they are wrong is not an effective strategy to achieve theory restructuring. It is beneficial to instead address their naïve theory by demonstrating how an expert theory can explain phenomena more broadly. In the case of teaching students about the spherical shape of the earth, she has designed instruction that addresses students' naïve theories about gravity (things fall down), and about the shape of the earth (it is flat). The instruction demonstrates how the world can

appear flat to someone standing on it and spherical to someone in space. While this research is common in mathematics and science education, it is not common in economics education (Aprea, 2015). Naïve theories about biology, physics, and mathematics are highly developed and researchers use this empirical evidence to design instruction that addresses naïve theories (Inagaki & Hatano, 2002; Vosniadou, 2013). Once researchers identify naïve theories, they can “design research-based curricula, based on students’ learning progressions which can identify the areas of students’ prior knowledge on which new scientific information can be built while at the same time highlighting the areas that need to be revised” (Vosniadou, 2013). This involves taking into account the short and long run sequence of lessons.

The benchmarks in the Standards represent a long run progression of learning to achieve mastery of the Standards. In order to affect learning, these benchmarks need to take into account students naïve economic theories. In this way benchmarks map a path that builds upon aspects of naïve theories that are consistent with expert theories and address inconsistencies in a way that fosters restructuring of the naïve theory. Economic education research has not ignored the development of children’s economic thinking. However, the research has not focused on how children think about economic events in their lives but has instead focused on Piaget’s stages of development and children’s acquisition of economic knowledge as it relates to consumer, producer, and saver behaviors as conceived by adults (Webley, 2005). Without understanding children’s naïve economic theories first, educators will not be able to design instruction that effectively assists children in developing expert theories about economic systems.

In the next section I present an historical review of the literature in the development of economic thinking. I present what research tells us about how children think about economic concepts and how thinking changes as children age. This research is primarily focused on children's understanding of adult economic events, but limited research also investigates children's understanding of intra-child economic events.

Research in economic socialization: An historical perspective

According to Furnham (1996), "*socialization* is generally defined as a process through which individuals learn to interact in society. It concerns learning social roles and acquiring the knowledge and skills related to them." *Societal cognition* is a measure of "understanding of societal institutions, structures and groups" (Barrett & Buchanan-Barrow, 2005). Using this definition, *economic socialization* is the process by which individuals learn to participate in the economic system in which we live, including understanding their role(s) and the knowledge and skills required to enact those roles; *economic cognition* is a measure of understanding of economic institutions, structures, and groups.

In the introduction to a volume on research in economic socialization, Lunt (1996) summarizes the progression of the literature in economic socialization, identifying three stages. In the first stage, researchers described the economic thinking of children and established that thinking developed as children aged. In the second stage, researchers applied Piaget's stages of cognitive development to the development of economic knowledge. In the third stage, researchers acknowledged and incorporated social factors into the development of economic knowledge. Barrett & Buchanan-Barrow (2005), in a review of research on social cognition, report that these

stages mirror the progression of social cognition research in other areas including politics, law, occupational groups, and national groups. Additionally, they extend Lunt's work by commenting on new directions in social cognition research, explaining that contemporary themes include incorporating naïve theory frameworks into research design and methodologies.

In this section I trace the path of research in economic socialization from the 1950s through the present, emphasizing shifts in focus beginning with explorations of how Piaget's stages of cognitive development may apply to domain-general social cognition, then moving towards domain-specific research in economic socialization, next branching to include social and cultural factors that affect the development of economic thinking, and finally culminating in a re-conceptualization of economic socialization away from children's understanding of adult economic events and towards children's perception and solving of their own economic problems. Three tables, Table 2, Table 3, and Table 4, provide overviews and visual comparisons of the literature in this section. Table 2 presents a chronological overview of all of the studies, and includes the researchers' specialization area, the economic content being investigated, the theoretical framework, methods, and the age range of the participants in the sample. Tables 1.3 and 1.4 provide visual comparisons of authors' developmental stages in economic socialization. Table 3 provides a comparison for all studies for which authors found that stages were associated with specific ages. Table 4 provides a comparison for all studies for which authors identified stages in economic socialization, but did not specify the age associated with each stage.

Table 2 Chronological list of economic socialization literature

Study	Specialization Area	Economic Content of Interest	Theoretical Framework	Age	Method
Schuessler & Strauss, 1950	Sociology	money and exchange	Piagetian Cognitive Development	4-11	Interview
Strauss, 1952	Sociology	money and exchange	Piagetian Cognitive Development	4-11	Interview
Danzinger, 1958	Psychology	Meaning of rich and poor, use of money, role of bosses	Piagetian Cognitive Development	5-8	Interview
Williams, 1970	Family and Consumer Science	Economic vocabulary		6-12	Interview
Furth, Baur, & Smith, 1976	Social sciences	Domain general framework for children's understanding of society; economics as the specific case to represent the general	Piagetian Cognitive Development	6-9	Interview
Jahoda & France, 1979	Social psychology	Consumer behaviors of buying and selling	Piagetian Cognitive Development	6-12	Role-play & illogical stories
Furth, 1980	Social sciences	community, societal roles, money, shops, school, the bus, government, and home	Piagetian Cognitive Development	5-11	Interview
Burris, 1982	Sociology	Commodity, value, exchange, property rights	Cognitive Development/Social Construction	4-12	Interview
Burris, 1983	Sociology	Work, income, and property rights	Cognitive Development/Social Construction	4-12	Interview
Leiser, 1983	Economic psychology	Prices, salaries, strikes, investments, inflation, money printing	Piagetian Cognitive Development	9-12	Interview
Schug & Birkey, 1985	Economics	Scarcity, choice, opportunity cost, monetary value, price, exchange, advertising	Piagetian Cognitive Development	4-9	Interview
Berti & Bombi, 1988	Psychology	work, source of money, rich vs. poor, exchange, factors of production and ownership	Piagetian Cognitive Development	3-14	Interview
Furnham & Cleare, 1988	Psychology	Prices, salaries, strikes, investments, inflation, money printing		11-16	Interview
Sevon & Weckstrom, 1989	Economics	Taxes, printing money, increasing resources, agents, change in shoe prices	"Knowledge structures"	8-14	Interview
Harrah & Friedman, 1990	Psychology	Prices, salaries, strikes, investments, inflation, money printing	Piagetian Cognitive Development/Social Construction	8-14	Interview
Leiser, Sevon, & Levy, 1990	Social psychology	Knowledge, reasoning, attitudes about economics	Economic socialization	8-14	Interview
Webley, Levine & Lewis, 1991	Economic Psychology	Saving behaviors	Economic socialization	6-12	Simulation and Interview
Sonuga-Barke & Webley, 1993	Economic Psychology	Saving Behaviors	Economic Socialization	6-12	Simulation, Game, & Interview
Siegler & Thompson, 1998	Psychology	Functional relationships between supply /demand	Naïve theories of economics	4-10	Story-based problems
Thompson & Siegler, 2000	Psychology	Understanding and causality in supply/demand	Naïve theories of economics	6-10	Story-based problems
Leiser & Halachemi, 2006	Economic Psychology	Supply and demand	Economic socialization (?)	6-12	Story-based problems
Otto, Schots, Westerman, & Webley, 2006	Psychology	Development and use of savings strategies		6-12	Game & Interview

Table 3 Stages in economic socialization with ages

Study	Age in Years	4	5	6	7	8	9	10	11	12	13	14
Schuessler & Strauss, 1950		1. cannot match coins		4. can perfectly match coins; does not understand exchange		9. "conservation of value"						
			2. can give a coin in return for receiving a coin		5. size determines value		11. understands exchange well					
Strauss, 1952		3. gives a coin back if coin is same size or color			6. size does not determine value							
					7. "fair" understanding that different combinations of coins can be the same value							
					8. understands "well" that different combinations of coins can be the same value							
					10. exchange understood for "simple combinations"							
Strauss, 1952		1. money is associated with buying all coins equal value		2. coins of higher value buy more		6. change is given not based on like/dislike; begin to believe that buying now and paying later could be okay (credit)						
				3. change is not always given after a purchase; "shopkeepers" sell to make money								
				4. seller benefits from exchange			8. sellers buy for a lower price and sell for a higher price					
				5. sales not dependent on like/dislike of individuals; makers must pay for workers as well as supplies								
				7. proportional relationship in division of earnings between shopkeeper and worker; money is not only an "agent" but also an end								
								9. seller may intentionally give incorrect change;				

Furth, Baur, & Smith, 1976		1. Arbitrary: "social events are observed and accepted without further interpretation"	2. Primitive Functional Differentiation: "inference with some recognition of social functions involved"	3. Part System: "beginning to recognize social functions and obligations"	4. Coherent Global Sys: "an overall system of relations ... against which they can check reasonableness of an interpretation"				
Jahoda & France, 1979		Type 1: doesn't demonstrate understanding of a system		Type 2: demonstrates understanding of two unconnected systems		Type 3: demonstrates understanding of two integrated systems			
Furth, 1980		Stage 1: Personalistic Elaborations and Absence of Interpretive System - do not understand the functions of money, view transactions as rituals	Stage 2: Understanding of first-Order Societal Functions –understand money is a medium of exchange, however, they do not understand how money is used by shopkeepers		Stage 3: Part-Systems in Conflict – understand shopkeepers must purchase the goods they sell, but not the relationship between the prices paid by consumers and by shopkeepers; increasing awareness of conflict in the two systems of purchases	Stage 4: A Concrete-System Framework - understand that the money paid to a shopkeeper pays for both the cost of the good as well as for the living expenses of the shopkeeper			
Leiser, 1983		children view economic events as transactions, rituals, not part of a broader system	economic transactions, previously seen as rituals, develop into concepts; children begin to notice when concepts conflict		as economic reasoning develops, children try to resolve conflicts in conceptions;				

Berti & Bombi, 1988	Level 1, Pre-operatory period: "pre-economic" children have scripts about exchanges; don't understand scarcity								Level 4, Formal Operatory Period: economic systems are seen as interconnected; children understand owner can be separate from manager and that some institutions are private and others are public
		Level 2, Intuitive Level: children understand production and that value differs for goods/services as well as for work							
			Level 3, Concrete Operatory Period: understand two separate systems: getting paid for doing work, and spending money to purchase goods/services, however, these two systems are separate						
Sevon & Weckstrom, 1989				"homo sociologicus" schema					"homo economicus" schema
Leiser, Sevon, & Levy, 1990				Social man evident in conceptualization of the economy					Economic Man evident in conceptualization of the economy
Sonuga-Barke & Webley, 1993	Demonstrate formal savings behaviors; apply social values to economic events							Demonstrate functional savings behaviors; apply economic values to economic events	
Siegler & Thompson, 1998	correct understanding of factors affecting demand		correct understanding of factors affecting supply and demand						
Thompson & Siegler (2000)		rely on "social man" point of view	children demonstrate all four components necessary for an economic theory; rely on "economic man" point of view						
Otto, Schots, Westerman, & Webley, 2006		less sophisticated savings strategies; less optimal		more sophisticated savings strategies; more optimal					

Table 4 Stages in economic socialization without ages

Age in Years Study	4	5	6	7	8	9	10	11	12	13	14	15	16	17	22-23	
Danzinger, 1958		1. Pre-Categorical - child lacks economic categories of thought 2. Categorical - concepts represent a reality in terms of isolated acts explained by a moral or voluntaristic imperative 3. Conceptualize relationships as reciprocity between previously isolated acts 4. relationships are seen as part of a system														
Williams, 1970			older children understand economic vocabulary that younger children do not understand; knowledge varies by age, race, socioeconomic status, experience with money, and where the participant lives													
Burris, 1982 & 1983	qualitative differences in responses are associate with age; responses increase in complexity with age															
Schug & Birkey, 1985	Economic reasoning moves from "unreflective" to "emergent" with increases in age; becomes more abstract and less tautological; economic reasoning also varies based on a child's experiences															
Furnham & Cleare, 1988								age is correlated with increasingly complex reasoning as well as with increased knowledge of economic concepts; however, even at 16 years, most participants demonstrated incomplete knowledge								
Harrah & Friedman, 1990					economic understanding increases with age; younger children had "simple subsystems of knowledge" while older children had "integrate(d) subsystems";											
Webley, Levine & Lewis, 1991			Older children save more and are more successful savers; savings strategies are different based on age.													
Leiser & Halachemi, 2006			As children get older, they are increasingly able to give correct explanations for changes in supply and demand and the effect on equilibrium price. Regardless of age, more successful describing effects in markets that use money vs. markets that use barter. Children understand demand relationships prior to supply relationships; younger children are more likely to use moral reasoning than economic reasoning. Age is associated with increases in economic reasoning.													
Davies & Lundholm, 2012								For participants aged 11-17, most likely response was that a good/service should be provided for free based on what was 'normal'. No systematic variation by age. However, participants earning a master's in economics (22-23 years) were less likely to give a "normality" response. 1. "whether something should be made available for free is taken for granted reflection of experience of what is normal" 2. "goods and services should be made available for free on the basis of people's need" 3. "goods and services ought to be provided at a price which covers the cost of providing" 4. "the price should encourage the internalization of externalities"								

Domain-general research: Social cognition and Piaget

Interest in how children think about economics began as early as the 1950s with Schuessler & Strauss (1950). They used economic socialization as a specific case to represent the general case of socialization. These sociologists were looking for evidence that social development followed the same patterns theorized by Piaget for cognitive development. This comparison of social development to cognitive development motivated many of the early studies and proved to be a major strand in the research. Early studies focused on domain-general social development, with researchers using economics as a tool to understand socialization more generally. This focus on domain-general socialization and Piagetian stage-like development continued through the 1970s. This body of research presents strong evidence to support children's social development occurs in a stage-like fashion with increasing abstraction and complexity corresponding with later stages of development. The remainder of this section is devoted to describing nine studies that represent important research in this stage of the literature.

Schuessler & Strauss (1950), recognized as some of the earliest research in the field (Schug, 1981; Berti & Bombi, 1988; Furnham, 1996), developed a three-part assessment to investigate whether Piaget's stages could be applied to social concepts. For their investigation the authors selected two concepts: coins and the use of money in making purchases. They justified the use of these concepts as representative social concepts by stating that money is central to culture in "Western thought". The sample, n=141 children between the ages of four and fourteen years, was drawn from two different schools in Bloomington, Indiana. The sample included approximately five males and five females from each grade level. The researchers conducted interviews

with each participant in which they asked participants to respond to the questions from the three-part assessment. Schuessler and Strauss used scale analysis to identify scale types and to rank participants based on correct responses. The authors identified eleven scale types that represent eleven stages of children's thinking about money. Descriptions of the stages as well as associated ages are presented in Table 3. Due to the nature of scale analysis, the mean ages for stages as well as age ranges overlap, however, the authors find that conceptual understanding developed gradually and moved from "simple to complex, from concrete to abstract, from discrete to systematic, from undifferentiated to differentiated, from rigid to flexible, [and] from egocentric to non-egocentric" with age.

Strauss (1952), building upon findings in Schuessler & Strauss (1950), utilized scale analysis to identify scale types, or stages in understanding, of money and its use for buying and selling from a 71-item test. The sample, n=66 children between the ages four and eleven, was drawn from a school in Bloomington, Indiana. The sample included approximately five males and five females from each grade level. The researchers administered the 71-question assessment over three interviews with each participant. The author identified nine scale types, or stages, of conceptual understanding. These stages are described in Table 3. Similarly to the stages in Schuessler & Strauss (1950), Strauss's stages have overlapping mean ages and age ranges. Strauss concludes that conceptual development with respect to money occurs in stages, and not along a continuum, is predicated upon the child achieving the knowledge in the previous stage, is cumulative, and that stages not only represent common conceptual understanding, but also systematic errors in understanding.

Similarly to Schuessler and Strauss, Danzinger (1958) utilized economic content to hypothesize a domain-general framework for the development of social cognition. Danzinger, a psychologist, employed Piaget's clinical interview method to investigate children's conceptions of the meaning of rich and poor, the use of money, and the role of a boss at work. The sample, n=41 children between the ages five and eight years, was drawn from children in Melbourne, Australia. The interview consisted of ten questions. Danzinger identified four stages of development evident across the responses to the ten questions. The four stages are: 1. Pre-categorical, in which children lack economic categories of thought; 2. Categorical, in which economic concepts are seen as isolated acts governed by moral or voluntaristic imperative; 3. (Unnamed stage), in which children identify reciprocity as the basis for connections between economic acts; 4. (Unnamed stage), in which economic acts are seen as part of a system. While the author finds that higher stages are correlated with increases in the age of participants, there is no specific age or age range associated with each stage. Danzinger's stages are included in Table 4. The author concludes that further study is needed to confirm that development in economic concepts is characteristic of development in other areas of social cognition.

Furth, Baur, & Smith (1976) were also interested in identifying domain-general stages of social relationships that correlated to Piaget's stages of development. They employed Piaget's clinical interview method asking participants to talk about, "school and teachers, shops and shopkeepers, buses and drivers, the communities in which they live and services with which they are familiar, acquisition and functions of family roles, money, doctors, police, and government". Unlike the previous studies, the authors analyzed participant responses with a focus on thinking process rather than

accuracy. The sample, n=180 children age five to eleven years, was drawn from primary schools in three different areas of Southern England. The authors identified four stages of understanding. The four stages are: 1. Minimal Inference, where children observe events, but do not further interpret or explain what they have observed; 2. “Inference with some recognition of social functions involved” where children have narrowly defined understandings of social relationships; 3. Expanded Functional Understanding, where children begin to understand social functions and organization, but the functions (for example buying and selling) are not connected; 4. (Unnamed), where children use a system of relationships to understand the social world as well as understand rules that govern social institutions. While the stages are described as sequential, the authors do not conclude that specific stages are correlated with specific ages. The stages are included in Table 4.

Furth (1980) drew on the methodology in Furth, Baur & Smith (1976) and extended findings, further clarifying stages and ages associated with stages. Unlike the open ended interview where participants were asked to “talk about” different concepts in the earlier study, Furth (1980) employed a more structured interview protocol with specific questions about communities, societal roles, money, shops, school, the bus, government, and home. In keeping with the previous study, Furth was interested not in accuracy of answers, but in patterns of thinking about society. The sample, n=195 children ages five to eleven years, was recruited from three primary schools in three different areas of southern England. The areas were purposively selected to include a small village, a small town, and a larger community with a population of 200,000. The distribution of males and females was approximately equal across all ages. While Furth did not find significant differences based on gender or size of community, he did

identify four stages of thinking strongly correlated with age. The first stage, Personalistic Elaborations and Absence of Interpretive System, was most common in children aged five to six years. In this stage, children do not understand the functions of money. They view transactions as rituals and often do not offer explanations. When they do offer explanations for transactions, the explanations are related to the child's own physical or psychological experiences. The second stage, Understanding of First-Order Societal Functions, was most common in children aged seven to eight years. In this stage, children understand when they make purchases that money is a medium of exchange, however, they do not understand how shopkeepers use money. It is important to note that children seem unaware of the inconsistencies in their thinking at this stage. The third stage, Part-Systems in Conflict, was most common in children aged nine to ten years. In this stage, children now understand that shopkeepers must purchase the goods they sell, but the relationship between the prices paid by consumers and shopkeepers is not understood. Unlike in Stage two, children in Stage three are becoming aware of the potential conflict in how they understand the two systems of purchases. For example, if the shopkeeper buys an item for five dollars and sells that same item for five dollars to a customer, then the shopkeeper will not have any money to buy food for herself. The fourth stage, Concrete-System Framework, was most common in children aged ten to eleven years. In this stage, children understand the relationship between the price consumers pay and the price shopkeepers pay, specifically, they understand that the money paid to a shopkeeper pays for both the cost of the good as well as for the living expenses of the shopkeeper. These stages are included in Table 3. Furth also conceptualizes the first and last stages as 'true stages' and the middle stages as 'transitional' ways of thinking. In this

alternate conceptualization, Stage one is marked by “prelogical” thinking and Stage four is marked by the development of frameworks that allow children to resolve the illogical inconsistencies found in Stage one. Furth emphasizes that most children in primary school would be considered in a ‘transitional’ stage and claims that understanding this transitional way of thinking about society has important implications for teaching and learning, although he does not elaborate further about application to curriculum or instruction.

In contrast to the clinical interview method employed by previous researchers, Jahoda & France (1979) use a combination of role-play and illogical stories about buying and selling goods to investigate the development of children’s understanding of social systems. The authors used the combination of methods to investigate whether children’s behavior in a role-play indicated a deeper level of understanding than could be expressed verbally in response to the stories. Unlike previous authors, Jahoda & France question whether Piaget-like stages accurately describe development of social cognition and suggest that children’s background and experiences may affect the development of social cognition. This study is useful in demonstrating the shift away from Piaget and towards socio-cultural factors as determinants of economic understanding. The sample, n=120 children age six to twelve years, was drawn from Glasgow, Scotland. During the role-play, children played the role of shopkeeper and the researchers played the roles of customer and supplier. During the interview, the researcher presented the child with a story about an exchange between a customer and shopkeeper with an economic inconsistency and asked the child if there was something ‘funny’ about the story, and if so what was funny. The authors identified three response types. These response types are identified by age range. The first type

of response, most common in participants aged six to seven years demonstrated no understanding of a system. They saw transactions between customers and shopkeepers as ritual, without a rationale or purpose. The second type of response, most common in participants aged eight to nine years, demonstrated an understanding of two systems, but the systems were not connected. They realized that shopkeepers have to purchase the goods they sell to customers, but do not realize that shopkeepers use money from the customers to purchase goods. The final response type, most common in participants aged ten to twelve years, demonstrated an understanding of two integrated systems. They understood the relationship between the price paid by shopkeepers and the price paid by the customers. These stages are presented in Table 3.

Burris (1982, 1983) further develops Jahoda & France's assertion of the role of children's background and experiences in development of social understanding, while still heavily relying on Piaget's stages of cognitive development. In both studies, Burris investigated children's understanding of commodities, value, exchange, and property. In the latter study, Burris also included conceptions of property, work, and income. As with previous authors, Burris employed Piaget's clinical interview method. For both studies the sample, n=96 children aged four to twelve years, was drawn from a suburban area of the United States. The author identified response types that differed by the age of the child, and found evidence that reasoning develops similarly to Piaget's stages. These stages are presented in Table 4. Burris extends this sequential stage development to conclude that children's understanding of social systems is not a result of instruction from adults, but that children construct social knowledge through social interactions. Therefore, children's social class and background affect social understanding.

In contrast to the above authors, Williams (1970) was specifically interested in the development of economic knowledge, and its application to economics education curriculum. She operationalized economic knowledge by identifying a set of 69 economic terms from curriculum materials and other sources. Participants were scored on a scale from 0-2 on their ability to define the 69 concepts. The sample, n=300 children from grade one to grade six, were randomly selected from 18 elementary schools in Leon County, Florida. Fifty students were selected from each grade level with approximately equal percentages of male and female participants. The author also collected information on socio-economic status based on the father's occupation (unclassified, lower-lower, upper-lower, lower-middle, upper/upper-middle), race (white or non-white), rural or urban residence, and experience with money as determined by responses to interview questions (rated high, medium, or low). Williams presents a gradient that represents the economic concepts understood by a majority of participants at each grade level. Her findings are presented in Table 4. Within each grade level, she finds significant differences in conceptual understanding by race and by socio-economic status, thus providing additional evidence that socio-cultural factors may affect children's development of economic knowledge. Williams concludes that knowledge of economic concepts increases with age, and that knowledge of terms seem to be sequential with some terms only being known by older participants.

This study stands out from other studies from this time period. Williams treated economics as a separate domain, and considered the curricular applications of children's domain-specific vocabulary knowledge, while other researchers used economics as a specific case to examine domain-general social development without

an application to education. Additionally, Williams specifically investigated how children's background may affect their economic vocabulary knowledge while her contemporaries looked for similarities across all children instead of differences. While her research does not seem to be consistent with other studies conducted during this time, her work is relevant when considered in light of Lunt's (1996) third phase of research in economic socialization. This phase is described next.

Domain-specific research: Economic socialization, Piaget, and cultural influences

In the 1980s research shifted from a focus on domain-general social cognition, to a focus on economic development as a separate cognitive domain. During this time, domain-specific research in economic development emerged as a separate strand in the literature. Schug (1981), in a review of the economic socialization literature, called for research that focused on domain-specific development as well as its application to curriculum and instruction. Schug represents one of the few economic educators who have contributed to the research in this area (Webley, 2005). While research did transition to a domain-specific focus, his call for a focus on application to curriculum rarely appears in the literature, with the exception of Berti & Beni (1988), Schug & Birkey (1985), and Williams (1970). Throughout the 1980s and 90s, researchers continued to focus on cognitive stage-like development, but increasingly recognized the effect of a child's socialization on his/her development of economic knowledge. Here, studies making international comparisons were particularly influential allowing researchers to make cross-cultural comparisons as they replicated studies initially conducted in Western Europe with studies conducted in Southern Africa and East Asia (Jahoda, 1983; Ng, 1983). The remainder of this section is devoted to describing eight studies that represent research in this stage of the literature.

Schug & Birkey (1985), seemingly in response to Schug's (1981) call to action, focused on the domain-specific development of economic reasoning, emphasizing the application of their findings to curriculum and instruction in the elementary classroom. The authors broke with previous researchers and broadened the scope of their research to examine how children think about "basic economic concepts" including scarcity, choice, opportunity cost, monetary value, price, exchange, and advertising. This shift in scope is significant because it represents some of the earliest research wherein economists operationalized economic knowledge and reasoning. Focusing, as previous research had, on consumer behaviors resulted in a narrow definition of economic knowledge. While this narrow definition served to deepen our understanding of domain-general socialization, it limited our understanding of the development of economic understanding as defined by economists.

Schug & Birkey (1985) used a structured interview protocol to investigate the development of these more broadly defined economic concepts. The sample, n=70 children aged four to nine years, were recruited from three urban schools. The authors coded the interviews using descriptive codes, then based on the initial coding, identified two distinct types of reasoning evident in participant responses. The first type of reasoning, *unreflective reasoning*, is "characterized by ideas that were highly literal, linear, or tautological...often based on physical properties of the object or process". The second type of reasoning, *emerging reasoning*, is characterized by "higher order of reasoning wherein the participants were able to identify reciprocal relationships, see the viewpoint of others in a concrete context and were less literal, more flexible, in their responses". These two types of reasoning are similar to Furth's

(1980) first and last stages: stage one, where children's thinking is 'prelogical', and stage four, where children develop frameworks that allow them to resolve inconsistencies in their reasoning. Schug & Birkey (1985) conclude that their types of reasoning are consistent with Piaget's theory of cognitive development in that economic reasoning increases with age becoming more abstract as children move from reflexive to emergent economic thinking. These findings are presented in Table 4. Additionally, the authors recognize the effect of children's experiences on their economic reasoning. This leads to their first implication for curriculum. They suggest that economic reasoning might be improved by introducing personal economic experiences into the curriculum. Finally, based on content specific findings, the authors caution against teaching economic concepts like scarcity before children are demonstrating the ability to use the emergent reasoning necessary to understand such concepts.

While Schug (1981) called for an increase in the number of economists participating in research in the development of economic thinking, Schug & Birkey (1985) is one of the few studies in which economic educators have participated as authors. The literature continues to be dominated by sociologists and psychologists, but the focus has indeed shifted to a domain-specific focus on the development of economic understanding.

Leiser (1983) exemplifies this new strand in economic socialization research by stating his objective to establish economics as a separate cognitive domain within social cognition. Additionally, instead of focusing solely on microeconomic phenomena like buying and selling, Leiser investigates macroeconomic phenomena like inflation and changes in the money supply. The author used open-ended

interviews in phase one to develop a 41-question questionnaire covering macro- and microeconomic concepts for use in phase two. The participants, n=44 children ages eight to fifteen years, were selected from a “poorer section” of Beer Sheva, Israel. During the semi-structured interview, the researcher asked each participant all questions from the questionnaire, asking participants to clarify answers when necessary. It is through this clarification process that Leiser determined that participants’ responses do not always indicate everything they know, and therefore results from interviews should be interpreted carefully. He emphasized that results from interviews cannot confirm what participants don’t know, but only what they were thinking at the time.

Leiser (1983) identifies two modes of understanding in economics: *conceptions* and *reasoning*. Conceptions are “small coherent systems of concepts and beliefs, which define the roles of the participants in an economic interaction from the perspective of one of them, and assign meaningful motives to their actions”. Reasoning is “a set of processes by which the subject judges propositions, compares or evaluates them, or derives their consequences.” Growth in economic understanding is conceptualized as the development of these two modes of understanding. Leiser identifies three stages in economic understanding based on these modes. First, children aged five to six years view economic transactions as interactions between individuals, and not part of a larger system. These interactions are first seen as rituals, and then evolve into conceptions. Conceptions assign meaning to actions, although adults or economics experts may not accept as accurate the same meaning assigned by children. Second, as these concepts develop, they often conflict with each other. Children aged nine to eleven begin to recognize these conflicts. The third stage occurs around age

eleven when children try to resolve the conflicts in their conceptions. This is a result of the development of their reasoning. They see conflicts as resulting from inconsistencies in their judgment. Because they have increased reasoning ability, they are able to understand economic systems that were not accessible to them in a conceptions-based system. These stages are presented in Table 3. Leiser emphasizes his findings are exploratory and encourages further study. Following his call for further study, several authors replicated Leiser's questionnaire and methods (Furnham & Cleare, 1988; Harrah & Friedman, 1990; Leiser, Sevon, & Levy, 1990).²

Furnham & Cleare (1988) extended Leiser (1983) utilizing similar methods, including a nearly identical questionnaire. However, they extended their analysis to investigate the effects of gender and class on economic understanding. The sample, n=134 participants aged eleven to sixteen years, was drawn from a secondary school in southern England. The sample was approximately equally distributed between male and female. The authors ranked participants' socio-economic class as upper, middle, or lower, based on father's occupation. The authors did not find a significant relationship between class and economic understanding, but they did find some differences in economic understanding by gender. The authors hypothesize the lack of class-based differences can be explained by looking at 'school culture'. They argue that the effect of peers and teachers on socialization may be stronger than the effect of parents; therefore, participants in the same school would have similar economic understanding regardless of fathers' occupation. The authors conclude, similarly to Leiser (1983), that age is correlated with increasingly complex economic reasoning as

² Leiser, Sevon, & Levy (1990) is a meta-analysis of 10 studies, each conducted in a separate country using Leiser's questionnaire and methods. These studies are all compiled in the 1990 *Journal of Economic Psychology*, 11(4).

well as increased economic knowledge. However, they express concern that even at the age of sixteen most participants demonstrate incomplete economic knowledge. They use this finding to support increasing economic education within the schools. Their findings are presented in Table 4.

Harrah & Friedman (1990) replicated Leiser (1983) with an additional focus on the effect of economic experiences on economic knowledge. Harrah & Friedman (1990) used a revised version of Leiser's questionnaire (revised by Leiser for a multi-national comparative study; Leiser, Sevon & Levy, 1990). The sample, n=87 children aged eight, eleven, and fourteen years, was recruited from a Midwestern town in the United States. The authors classified all participants as middle class based on their parents' occupations. Using a question about participants' experience shopping, the authors grouped participants by level of experience (either no experience, experience shopping with a parent, or experience shopping alone). The authors found significant but modest correlations between level of experience and economic knowledge about shopping events for participants aged eight and 11. They were not able to examine this relationship for fourteen-year-old participants as all fourteen year olds in the sample had experience shopping alone. Additionally, the authors found a strong relationship between age and levels of economic knowledge and reasoning. Knowledge in younger participants differed from knowledge in older participants in that older participants had integrated systems of knowledge while younger participants did not integrate knowledge into systems. These findings, presented in Table 4, are consistent with previous studies using Leiser's questionnaire.

Leiser, Sevon & Levy (1990) provide a meta-analysis of ten studies, conducted in ten different countries, utilizing the revised Leiser questionnaire. The sample,

n=990 middle class participants aged eight, eleven and fourteen years, were recruited from ten different countries, Algeria, Austria, Denmark, Finland, France, Israel (town and kibbutz), Norway, Poland, West Germany, and Yugoslavia. Approximately 30 children were recruited from each age group in each country with approximately equal numbers of males and females in each group. The authors conclude that age is the strongest determinant of economic understanding. They maintain that understanding increases in depth and breadth with increases in age. These findings are presented in Table 3. Overall, attitudes about economics are relatively stable across ages. The authors do find differences in attitudes between countries that may be attributable to institutional and cultural differences. For example, in countries with more government intervention, children were more likely to discuss the role of the government in economic events than in countries with less government intervention. Additionally, cultural values about wealth and poverty appear to be reflected in children's attitudes. This can be seen clearly in responses of Israeli children when children's responses from 'towns' are compared to children's responses from 'kibbutz'.

Although Leiser, Sevon & Levy (1990) found some evidence of differences in children's attitudes that they attribute to differences in cultural and institutional factors, earlier studies using cross-country comparisons found differences in the ages at which children developed understanding of economic concepts. Jahoda (1983), using the role-play method developed in Jahoda & France (1979), investigated whether personal experience in buying and selling or growing and selling affected the age at which children demonstrate types of economic understanding. The sample, n=108 children aged nine to eleven years, were recruited from six primary schools in Harare township, Zimbabwe. While the socio-economic status of participants was not

measured directly, participants lived in an area with a high population of lower socioeconomic status individuals. The author's hypothesis that this group of children had more relevant experience therefore would demonstrate higher levels of economic understanding at earlier ages than children in the UK was supported by the findings. Regardless of the type of market experience to which they were exposed by their parents, children in this study knew more about exchange than their counterparts in the UK at earlier ages.

Ng (1983) found similar results in his analysis of Hong Kong children's knowledge of bank and shop profit using a questionnaire adapted from Jahoda (1981). The sample, n=96 male children aged six to thirteen years, were recruited from a school in Hong Kong. While the sample represented a "wide range of socio-economic background" the author reports that most participants came from middle-class families. Ng found that understanding of both bank and shop profit occurred at earlier ages for children in the Hong Kong sample than children in Jahoda's (1981) sample of children from the UK. The author attributes these differences to participants', "higher level of economic socialization and consumer activities, and the business ethos of society at large". In his findings, Ng makes a strong argument for the effect of cultural factors on economic socialization. In conjunction with Jahoda (1983) we are presented with plausible evidence that cultural factors and children's experiences in solving economic problems affect the development of their economic understanding.

Even though evidence of the impact of social factors on the development of economic understanding was growing, researchers continued to explore the connection between Piaget's stages of cognitive development and social cognition. Berti & Bombi (1988) conducted a multi-phase study investigating Italian children's development of

economic understanding. They used Piaget's clinical interview method to investigate the development of children's ideas about work, the source of money, rich versus poor, exchange, factors of production, and ownership. The samples in each phase varied from n=60 to n=100. Although each study included approximately 20 participants per grade level, the number of grade levels varied by study. In the phase about work for example, researchers did not incorporate children at the pre-K level, as they would have little knowledge about the content of that phase. The authors find evidence of four levels of economic concept development, closely related to Piaget's stages of cognitive development. Level 1, the Pre-operatory Period, includes children ages three to six years and is described as "pre-economic". In this level, children have scripts about exchanges, and they do not understand scarcity. Level 2, the Intuitive Level, includes children ages six to seven years. In this level, children understand production and that the value of goods and services differs based on the good or service. They also understand that some work is more valuable than other work. Level 3, Concrete Operatory Period, includes children ages seven to ten years. In this level children understand two separate systems. The first system involves getting paid for doing work. The second system involves spending money to purchase goods and services. However, these two systems are separate. Children do not understand the connection between the money they pay to make a purchase and the money a worker receives for selling them the good or service. Level 4, the Formal Operatory Period includes children ages eleven to fourteen years. In this level, children see economic systems as interconnected. They understand that the owner of a productive resource can be separate from the manager. They also understand that some institutions are public and some are privately owned. These stages are presented in Table 3.

Comparing stages of development in economic socialization

As Berti & Bombi's (1988) multi-phase study represents one of the last times in which children's social development is explicitly mapped using Piagetian cognitive stages, it would be useful to compare the stages of development of social cognition from five studies beginning with Danzinger (1958) and concluding with Berti & Bombi (1988). The five studies posit clearly described stages with the first three, Danzinger (1958), Jahoda & France (1976), and Furth (1980) using economics as a specific case to demonstrate domain-general social cognition, and the last two, Leiser (1983) and Berti & Bombi (1988) viewing economics as a separate cognitive domain. I have excluded three studies from this comparison. The first two, Schuessler & Strauss (1950) and Strauss (1952) are excluded due to the overlapping stages as well as the focus on conceptual knowledge versus understanding at each stage. I also excluded the Furth, Baur & Smith (1976) study because it represents exploratory work that informed Furth's later stages (Furth, 1980). All of the studies, with the exception of Danzinger (1958), provide age ranges for each stage; this provides one method of comparing findings. Comparisons are also possible among the qualitative explanations of thinking or development at each stage.

All five studies describe the first stages of thinking as either *pre-economic* or *pre-categorical*. The age range for this stage starts as early as four years and continues through seven years. Children in this stage view economic events as rituals, without understanding that the events are part of a broader system. The final stage according to Jahoda & France (1976), Furth (1980), Leiser (1983), and Berti & Bombi (1988), occurs around the age of ten to eleven years and is categorized by an integration of previously unrelated systems and formation of an *integrated system*. Danzinger (1958) does not include a stage similar to the above authors, but perhaps this can be explained

by the age of his sample. Participants in his sample ranged from five to eight years, and therefore he might not have observed children who had achieved the stage described by the other authors. Interestingly, four studies that present an “integrated systems” stage often describe this phase as a time during which children are resolving conflicts between two previously unconnected systems. For example, they may have previously believed the price they paid for a candy was the same as the price the shopkeeper paid for the candy. They may have at the same time believed that the shopkeeper was paid for her work. However, the child at first did not see the conflict between the two systems. Once the child recognizes the conflict, in this case ‘where does the shopkeeper’s pay come from if all of the money she receives is paid to her suppliers?’ they move into the final stage where they resolve the conflicts and integrate the two systems of thinking.

Although there is consistency in the initial and final stages across the authors, the descriptions of the intermediate stages vary. Some authors, Jahoda & France (1979) and Leiser (1983), find evidence of three stages, but others, including Danzinger (1958), Furth (1980), Berti & Bombi (1988) identify four stages. Regardless of number of stages, all five authors identify that at some point between pre-economic thinking and the development of integrated economic systems, children view economic events as part of independent systems, and this is a result of moving away from viewing transactions as rituals that occur without need for further explanation. This analysis of multiple authors’ conceptions of stages fits nicely with Leiser’s (1983) view that the first and last stages represent true stages, and that the period between is a transitional period between stages. Moving forward in the literature, this interpretation is evident, and authors describe the development of

children's thinking in a before-and-after framework. Not all authors follow this pattern, however. Some describe a continuum of increasing knowledge and complexity of reasoning, but without explicit stages (Siegler & Thompson, 1998; Leiser & Halachemi, 2006). It is important to note, that with Berti & Bombi the popularity of describing stages of development in social cognition appears to wane.

Development of the “economic man”

In the late 80s and early 90s a new focus emerged. Researchers begin to formalize the development of *homo economicus*, or *economic man*, and identify an age-based delineation between *social man*, a person who makes decisions based on social norms and concern for others, and economic man, a person who makes decisions based on what is best for his own self-interest without regard for others well-being (Sevon & Weckstrom, 1989). Economists Sevon & Weckstrom (1989) provide the earliest reference to this formalized distinction between children who do not behave consistently with economic theories and children who do behave consistently with economic theories.

Sevon & Weckstrom (1989) replicate Leiser (1983) using a similar a questionnaire and similarly aged sample, however, their interpretation of results diverges from Leiser's interpretation. In fact, Sevon & Weckstrom's interpretation of results diverges from most previous research. Instead of comparing children's economic socialization to Piaget's stages of cognitive development, these authors used an economic framework, looking for evidence of when children began to process economic events in a way consistent with economic theories, specifically the *economic man* (Persky, 1995). Additionally, the authors argue that humans are actors in, and observers of, economic events and therefore view economic events as having

causes and effects. Since economic events can be conceptualized in a cause and effect framework, humans develop *event knowledge structures*. Event knowledge structures are “conceptualized as frames, schemas, and scripts based on the proposition that people use the personal and/or vicarious experience of an event or events to build theories about what and why something has happened and/or will happen if a similar event were to occur in the future”. Sevón and Weckström employ Leiser’s (1983) questionnaire to investigate the development of these event knowledge structures in children. Sevón & Weckström’s (1989) sample, n=105 children aged eight, eleven, and fourteen years, were recruited from “regular” schools in Helsinki, Finland. They found that as children get older, the number of children who are able to consider economic events from the perspective of others increases, event knowledge structures increase in complexity, and event knowledge structures incorporate more economic events. This finding is consistent with previous research: increases in knowledge and complexity of reasoning are associated with increasing age. Sevón & Weckström also identified a shift in thinking between the eight-year-old and fourteen-year-old participants. The eight year olds view economic events from a perspective of “consumers” who given income, are able to purchase what they want, and view equality as desirable and achievable. The authors refer to this as a *homo sociologicus*, or social man, schema where behavior is “governed by moral and social norms”. Alternately, the fourteen year olds view economic events from the perspective of an investor who tries to get rich using resources to gain profit. The authors refer to this as *homo economicus*, or economic man, schema. This is a longer-term view than the eight year olds’ view. For fourteen year olds the economy is a tool to achieve their

goals, for eight year olds, the economy is the setting in which they make their choices. These findings are presented in Table 3.

This distinction between social man and economic man is novel in the economic socialization literature, and subsequent studies incorporate this interpretation of the development of children's economic understanding. Leiser, Sevon, & Levy (1990), described in the previous section, interpreted their findings within the social man vs. economic man framework. In addition to concluding that economic knowledge and reasoning deepens and widens with age, the authors also delineate two types of thinking about the economy, "young children conceptualize the economy from the perspective of social man whereas some older children have shifted the conceptualization to that of the economic man". They find that eight and eleven year olds show more features of social man, and that fourteen year olds show more features of economic man. These findings are presented in Table 3.

Siegler & Thompson (1998) use a similar approach to economic reasoning as Sevon & Weckstrom (1983) by emphasizing the importance of cause and effect in economic events. Their study involved telling participants stories about a lemonade stand in which one aspect of the story would change creating a before-and-after scenario. The participant would be asked what effect the change would have on either the supply of lemonade or the demand for lemonade. For example, first there may be one lemonade stand in a neighborhood and 10 cups of lemonade are sold in one day. The next day there are two lemonade stands. The participant might be asked if the first seller could expect to sell more, less, or the same number of cups of lemonade on the second day as on the first day. Responses and explanations were recorded and scored for accuracy. The participants, n= 59 children ages four to ten years, were recruited

from private schools in Pittsburgh, Pennsylvania. The number of males and females were approximately equal, and all participants came from middle class families. The authors found that children understand demand relationships before supply relationships. Similarly, to Sevon & Weckstrom (1989) and Leiser, Sevon, & Levy (1990) they found that even in the ten-year-old participants, there was a tendency to attribute morality and motivation as causal factors affecting sales of lemonade. In one story, for example, the seller took some cookies that her mother told her not to take. Then later in the day she sold less lemonade. Younger children were more likely to explain the decrease in sales was caused by the taking of the cookies earlier in the day. These findings are presented in Table 3.

In an extension of their first study, Thompson & Siegler (2000) utilized a *naïve theory* framework to conceptualize economic understanding. They sought evidence to support the existence of children's naïve economic theories, emphasizing that a theory needs a distinct ontology, unobservable constructs, and causal relationships. They again used stories about a lemonade stand and changes in supply, demand, and price to investigate children's understanding of causal relationships in supply and demand. The sample, n =60 children aged six to nine years, were recruited from private schools in Pittsburgh, Pennsylvania. The number of males and females were approximately equal, and most participants came from middle class families. The authors again found that younger children rely on social man's point of view to explain economic events and that older children rely on economic man's point of view. This is consistent with younger children in their earlier study incorrectly assigning causation to moral and immoral actions (Siegler & Thompson, 1998). They also find that all elements of a naïve theory, distinct ontology, unobservable constructs, and causal relationships were

evident in the way second graders conceptualized economic events. These findings are presented in Table 3.

In a more recent study, Leiser & Halachemi (2006) extended Thompson and Siegler (2000) by trying to explain why children have difficulty explaining supply and demand. Leiser & Halachemi examined this in two ways. First, they compared how children responded to exchange stories involving money versus exchange stories involving barter. The authors hypothesized that perhaps the use of money in exchange stories could explain the difficulty children had in identifying causal relationships. The sample, $n = 48$ children aged six to twelve years, were recruited from schools in Beersheba and Kiryat Gat. The participants were equally distributed among male and female, and all children were from lower-middle class families. The authors used similar methods as Thompson & Siegler (2000), but added before and after illustrations to accompany the stories. Additionally, not all stories were about lemonade stands. Stories, for example, involved car washes, football cards, and chocolate candies. The authors found, contrary to their hypothesis, that children showed greater understanding of supply and demand relationships when the transactions involved money than when the transactions involved barter. In a second study, the authors hypothesized that children in Siegler & Thompson (1998) and Thompson & Siegler (2000) appeared to understand demand relationships before supply relationships because the relationship between demand and price is direct (if there is an increase in demand, the equilibrium price will increase) and the relationship between supply and price is inverse (if there is an increase in supply, the equilibrium price will decrease). In order to test this hypothesis, the authors asked children if buyers would be more or less happy when there was a change in demand or supply.

This changes the relationships to direct for supply and indirect for demand. The sample, $n = 48$ children aged six to twelve, was drawn from the same population as in the first study. Again, the numbers of males and females were identical. The authors found that even when the relationships were reversed, children were able to answer demand questions with more accuracy than supply questions. Finally, they conducted a post-hoc analysis of children's use of ethical rationale in their explanations. The authors found that at younger ages children are more likely to use ethics as rationale than older students. In summary, the authors have four main findings. First, as children get older they are increasingly able to give correct explanations for the effects of changes in supply and demand on equilibrium price. Second, children have an easier time at all ages drawing conclusions about changes in price in exchanges involving money versus exchanges involving barter. Third, children have an easier time predicting outcomes in prices that result from changes in demand than changes in supply regardless of whether the problem is posed as a direct or inverse relationship. Finally, younger children are more likely to give moral responses than older children, and older children are more likely to give economic responses. This final finding is consistent with previous research that younger children think more like social man and older children think more like economic man (Sevon & Weckstrom, 1989; Siegler & Thompson, 1998; Thompson & Siegler, 2000). These findings are presented in Table 4.

Caution should be exercised in interpreting results from Siegler & Thompson (1998), Thompson & Siegler (2000), and Leiser & Halachemi (2006) as their definitions for economic terms as well as their interpretation of economic models of supply and demand are not consistent with economists' definitions and models. For

example, in one story used by both Siegler & Thompson (1998) and Thompson & Siegler (2000), researchers told participants that usually a boy had the only lemonade stand on the block; the next day two of his neighbors had lemonade stands as well. The researchers asked participants if the original boy sold more, the same or less lemonade on the second day. The researchers believe that the correct answer is “less” arguing that an increase in the number of suppliers results in a lower quantity sold individual suppliers. While this is accurate for a perfectly competitive market, the lemonade stand in the story did not meet any of the criteria for a perfectly competitive market, thus it is not possible to tell what would happen to the number of cups of lemonade that John sells on the second day. Although the premise in Leiser & Halachemi (2006) is different, the underlying theoretical problems still exist in that they assume perfectly competitive market conditions, but do not meet the assumptions necessary for perfectly competitive markets. Additionally, in Thompson & Siegler (2000) the authors pose scenarios where a change in quantity sold causes a change in price. This is not consistent with economists’ models of supply. In economic models, it is price that causes changes in quantity supplied. This error in modeling is recognized by Leiser and Halachemi (2006). They acknowledge this weakness in their review of the literature and avoid this problem in their scenarios. Finally, the terminology used by Thompson and Siegler is inconsistent with terminology used by economists. The authors use the term *sales* when an economist would use the term *quantity supplied*, and they use the term *economization* when economists would use the term *utility maximization*. While differences in terminology may seem trivial, it is an indicator of the author’s expertise in economics. These inconsistencies call into question the content validity of the author’s results. They may have coded correct

responses and explanations as incorrect and vice versa, negatively affecting the reliability of their results. It is because of this that I recommend caution when interpreting results in Siegler & Thompson (1998) and Thompson & Siegler (2000).

This social man vs. economic man perspective implies a natural progression towards a ‘correct’ conceptualization of the economy, away from a ‘childish’ interpretation of economic events and towards a view of economic events upon which economists have built their theories. This progression from incorrect thinking to correct thinking is not only evident within the social man vs. economic man framework, but also in earlier work about how children think about shop profit, bank profit, and other economic concepts. Children’s thinking is continually compared to a standard of what is correct, or generally accepted by adults. While the social vs. economic man framework has the possibility of investigating and reporting different ways of thinking, it is conceptualized in the literature as a progression towards what is generally accepted, or what is correct. In contrast to this perspective, some authors have investigated how children think about their own economic problems instead of how much they understand about solving adult economic problems. Webley & Lea (1993) describe the possibility for this shift in conceptualization of economic socialization and provide a call to action for future research.

Naïve theories framework: Child-centered economic socialization

Webley & Lea (1993), two economic psychologists, advocate a shift in research on economic socialization, distinguishing between studying how children understand economic events and problems faced by adults and studying how children understand and solve economic problems with which they are faced. According to the

authors, this distinction shifts research foci from the adult economic world, to the child's economic world and from economic thought to economic behavior.

As a precursor to Webley & Lea's (1993) essay, Webley, Levine, & Lewis (1991) introduce this shift from children's understanding of the adult economic world, to children's recognition of and solutions to their own economic problems. The work in this study was informed by three prior studies (Sonuga-Barke & Webley, 1993)³. The authors select the concept *saving*, claiming that saving behaviors are an important factor in children's economic socialization. Selecting savings behaviors also allows the authors to investigate how children solve economic problems with which they are faced, instead of their understanding of how adults solve economic problems. Additionally, the authors intentionally focused on saving behaviors, not savings knowledge. This involved a method similar to the role-play employed by Jahoda & France (1979). Webley, Levine, & Lewis (1991) designed a *play economy* where children would set a savings goal and have an opportunity to earn, spend and save money across a time period representing six days. The sample, n=30 male children aged six, nine, and twelve years, were recruited from schools near Exeter, England. All children came from middle class families. The study took place in the play economy, which consisted of three rooms, each room containing different paid and free activities. One room also contained a bank where children could make deposits or

³ Sonuga-Barke & Webley (1993) is a compilation of seven studies on children's saving behaviors, which viewed together, represent a new direction for research in economic socialization. The authors provide a description of this new direction, as well as comments from two additional researchers in the form of two essays at the end of the book. Although the book was published in 1993, the fourth study was published as an article prior to the publication of the book (Webley, Levine, & Lewis, 1991). The methods and findings from studies one through three inform study four, but were not published until after the publication of the Webley, Levine, & Lewis (1991) article. I have chosen to cite the fourth study as it appears in Webley, Levine, & Lewis (1991), but will present overall conclusions and directions for future research from Sonuga-Barke & Webley (1993) as this reference provides a unique perspective in its compilation of findings from seven studies about children's saving behaviors.

withdrawals. The child's time in the play economy simulated six days, with ten minutes per day for a total of sixty minutes. Each child began the study with thirty tokens in the bank and they earned ten tokens per day for a possible total of ninety tokens. At the beginning of the study, children were shown a selection of toys and told to pick the toy they would like to take home with them. Then, they were told that in order to take the toy home with them, they would need to give seventy tokens. After they had selected the toy, they were given ten tokens, and spent one day, or one ten-minute period, in each room, visiting each room twice. In the rooms children could choose between free activities like drawing, and activities for which they had to pay like video games. One room also had a bank. When they were in the room with the bank they could either deposit or withdraw tokens. While children participated in the play economy, a researcher asked children questions about what they were doing and why. At the end of the sixty minutes, a child was designated as a successful saver if they were able to save the number of tokens needed to take home the toy they had selected at the beginning of the study. The authors found that older children are more successful savers than younger children. While none of the six year olds were successful in saving enough tokens to take home the toy, all but three of the nine year olds and all but one of the twelve year olds were successful. Perhaps more interestingly, the authors identified five savings strategies, and utilization of these strategies differed by age of the participants. The five savings strategies are: no attempt to save, spending a little each day, not spending at all, spending once the savings goal is met, and calculated savings. The youngest participants, aged six, either didn't save at all or saved by spending a little each day. The oldest participants, aged twelve, were more likely to use the fifth strategy, calculated savings. The nine year

olds were evenly divided among all five strategies. These findings are interesting because they not only capture success, but also the behaviors that led to success or failure and children's reasoning for those behaviors. These findings are presented in Table 4.

The authors conclude that the combination of methods, the play economy and interview during the play economy, resulted in richer interpretations of children's behavior (Webley, Levine & Lewis, 1991). For example, some children explained they knew they had a weakness for spending money on sweets, and as a result some would deposit money in the bank to avoid the temptation to spend their tokens on sweets. Additionally, the authors provide an alternative definition of success. While they define success as saving enough tokens to take the toy home, it is possible that when faced with the choice of playing games and eating candy during the play economy period or abstaining so they could take home the toy, some children may have decided that spending tokens in the play economy was more desirable than saving tokens for the selected toy. In this interpretation, the spenders may have been just as successful as the savers if the selected toy was not seen as having as high of a value as the purchases within the play economy. The authors focused on children's behaviors in a simulation of an economic problem they are likely to face, having some money, but not enough to do everything they want. In doing this, they provide a strong example of shifting the focus of research from how children understand the adult economic world, to how children approach and solve their own economic problems.

Sonuga-Barke & Webley (1993) develop this distinction more fully in a series of seven studies on children's saving behaviors. Studies one through three utilize a board game to simulate saving and spending, and studies five through seven examine

social influences on children's saving behaviors.⁴ Below I summarize findings from studies one through three.

Sonuga-Barke & Webley (1993) conducted three investigations of children's saving behaviors using a board game to simulate spending, saving and theft. Prior to the board game, children earned tokens by playing a game of skill whereby they pulled levers to toss balls into cups. Once they earned tokens, children picked a toy from a selection of toys that they would like to take home. This toy represented the child's savings goal. Next the child played a board game during which there were opportunities to purchase candy, save tokens in a various savings boxes (representing banks), lose tokens to robbers, and pay a toll to cross a river on the game board. The participants in the studies ranged in age from four years to twelve years, came from middle class families, and were approximately equally distributed between male and female. The authors acknowledge the limitations of using a board game to simulate children's economic behaviors, namely that children are likely to see the board game as a game, and not as real life. The authors overcome this shortcoming with their fourth study, presented in Webley, Levine & Lewis (1991) describe above. Taken together, the authors' conclusions across all four studies have similarities to previous studies about economic socialization. Firstly, they differentiate saving behavior as *functional* and *non-functional*. Functional saving behavior is problem-solving behavior occurring when a child identifies saving as a solution to an economic problem (in this case, not having enough tokens to keep the selected toy). Non-functional saving

⁴ Study four was previously published as Webley, Levine & Lewis (1991). Studies five through seven fall outside the scope of this review as studies five and six are examinations of savings institutions' marketing materials aimed at adults and children respectively; study seven examines parents' perspectives about children's savings through interviews with parents. However, taken together, analysis of studies one through seven provide the authors with an opportunity to broaden the scope of their conclusions about children's savings behaviors.

behavior is a ritualistic behavior engaged in because it is expected or correct to do so (i.e. parents tell children to save so they save without an understanding of the problem-solving nature of saving). Across the four studies, it was only the twelve-year-old children who engaged in functional saving behaviors; children aged four to nine engaged in non-functional saving behaviors. This distinction between non-functional and functional saving behaviors is similar to the first and last stages identified by Jahoda & France (1979), Furth (1980), Leiser (1983), and Berti & Bombi (1988) in that the youngest children view economic transactions as rituals, and at around eleven years, children understand economic transactions as part of an integrated and meaningful system of interactions. Sonuga-Barke & Webley (1993) extend this finding by demonstrating that while all children in the sample demonstrate the target behavior, saving, only the twelve-year-old children understand the function of the target behavior is to solve an economic problem. Additionally, younger children demonstrated socially motivated behaviors instead of economically motivated behaviors. When given a choice between paying a toll and losing tokens to theft, younger children chose to pay more tokens in the form of a toll even though losing tokens to theft would have resulted in losing fewer tokens. Twelve-year-old children preferred losing fewer tokens to theft than to paying more tokens for the toll. The authors interpret this as younger children preferring the socially preferable outcome and older children preferring the economically preferable outcome. This is consistent with earlier findings about the development of economic man. Studies found that younger children viewed economic events from a social perspective while older children viewed economic events from an economic perspective (Leiser, Sevon & Levy, 1990; Sevon & Weckstrom, 1989; Siegler & Thompson, 1998; Thompson &

Siegler, 2000). However, Sonuga-Barke & Webley (1993) provide evidence that children not only think differently, but behave differently as well. These findings are presented in Table 3.

Sonuga-Burke & Webley (1993) situate their seven studies in what they call a socio-developmental approach, which they place in contrast to the cognitive-developmental approach employed by previous researchers. They identify four limitations of the cognitive-developmental approach. First, the cognitive-developmental approach focuses on form rather than function resulting in a narrow definition of economics. Consequently, research has focused on buying and selling, for example, instead of how individuals solve the problem of allocating scarce resources. Second, researchers have taken the perspective that children gradually come to participate in the economic world of adults, therefore, they have not studied the economic problems that children face and the ways in which they solve those problems. Consequently, research has focused on profits shops earn, for example, instead of trading and swapping behaviors in schools. Third, researchers have focused on “the development of economic cognition and the acquisition of economic knowledge...rather than the development of economic behavior”. Fourth, researchers have investigated development of economic cognition from the perspective that changes within the individual are the causes of development, and have placed significantly less emphasis on variations due to socio-cultural factors. Consequently, research has focused on similarities in children’s economic development rather than differences in development among children.

In response to these four limitations, Sonuga-Barke & Webley (1993) suggest an alternative approach, a socio-developmental approach, in which “economic

intentions are constructed within the social group and are fulfilled by the practical actions of individuals aided by the availability of the formal institutions or economic facilities.” They identify three guiding principles for this approach. First, economic actions are rooted in historical and cultural practices. In order to understand economic actions, researchers must place those actions in historic and cultural context. Second, research should define economic events functionally instead of formally. This allows a broader definition of economic events, leading to the third and final principle: research about children’s economic development should take the child’s perspective. Instead of focusing on how children understand the adult economic-world, research should focus on how children “solve problems of resource allocation” with which they are faced. While the authors acknowledge that children are influenced by the economic world of adults, they also solve their own economic problems without access to adult institutions like banks.

Webley & Lea (1993) describe two studies that adhere to the three guiding principles established in Sonuga-Barke & Webley (1993): the first, Bardill and Traub (as cited in Webley & Lea, 1993), describes children’s swapping and trading behaviors; and the second, Webley & Webley (1990), describes a children’s economic system based on marbles.

Bardill and Traub (as cited in Webley & Lea 1990) describe a study of children’s swapping and trading behaviors. The authors observed children engaged in trades and conducted informal interviews where they asked children about the swaps they made. They find children make swaps for three reasons. First, they may trade if they believe they will receive a good of greater value. Second, they may trade if they believe there is a social benefit to trade. Finally, they may trade because trading is fun.

Children also identified three types of swaps. The first type of swap, a *good swap*, occurs when a child perceives the item they receive has a higher value than the item they give up. The second type of swap, a *bad swap*, occurs when a child perceives the item they receive has a lower value than the item they give up. The third and final type of swap, a *fair swap*, occurs when the value of the item received and the item given up are equal. Children willingly engaged in all three types of swaps, often stating the reason they engaged in a bad swap was for social benefit. This study demonstrates the three principles outlined in Sonuga-Barke & Webley. The research is focused on economic events important to children, swapping behaviors, and the researchers interpret findings based on cultural significance identified by the children themselves.

Webley & Webley (1990), the second study identified by Sonuga-Barke & Webley (1993), examined a playground economy where marbles were an important resource. The sample, n=34 children aged eight to eleven years, were recruited from a school in Exeter where playing marbles was a popular activity at recess. The first phase included interviews with children about playing marbles. Based on the interviews, the authors identified several marble-related behaviors and wrote five scenarios that incorporated those behaviors. Behaviors included swapping marbles, deciding the value of a marble, and times where one child would recruit a second child to play marbles for him in exchange for a share of the winnings. In the second phase, the researchers asked participants what would happen in each of the five scenarios. In the third phase, a child informant informally interviewed participants about marble behaviors. The authors present three findings. First, children identified a consistent relationship between the value assigned to a marble and its relative abundance; the more abundant a marble, the lower its value. Second, children believe some marble

behaviors are undertaken for social benefits. For example, children might engage in trades to gain popularity. Third, in interviews with the adult researcher, children claim the owner of the marbles and child recruited to play for the owner should split earnings equally. However, when the child informant conducted the interviews, children claimed the owner should keep more of the marbles than the recruited player. While the authors emphasize the exploratory nature of this study, it does adhere to Sonuga-Barke & Webley's (1993) three principles. Webley & Webley (1990) took a child-centered approach, defining economic events based on function and situating their understanding culturally. They investigated economic events that were important to children; and they identified evidence of an economic system where children allocated scarce resources according to a set of shared rules governing their behaviors.

Webley revisits this approach in Otto, Schots, Westerman & Webley (2006). Using a similar methodological approach. Otto, Schots, Westerman & Webley's (2006) use a board game to simulate saving and spending behaviors in children aged six, nine, and twelve years old. The participants begin by selecting a toy that they would like to take home. During the game, they have opportunities to earn money, as well as spend money. Unlike Sonuga-Barke & Webley (1993), Otto, Schots, Westerman & Webley's (2006) board game was unrolled as the game progressed. Thus the future, including length of the game and opportunities to earn and spend money, was unknown to participants. While Sonuga-Barke & Webley (1993) found that older children were more successful in saving for the target toy, Otto, Schots, Westerman & Webley (2006) did not find that age was correlated with success. When the authors consider the function of children's behavior, however, they do find significant differences. Through interviews and questionnaires, the authors find

children's intentions for saving differed by age. Older children were more likely to describe saving a specific amount as a buffer against the future, younger children were more likely to save all of their money. Therefore, the authors conclude that although success is not associated with age, older children are better able to solve economic problems in that they can save more optimally ending the game with fewer excess tokens. This study again exemplifies Sonuga-Barke & Webley's (1993) guiding principles. The authors investigated economic problems important to children, and through interviews and questionnaires considered the function of behavior as well as its cultural significance. These findings are presented in Table 3.

My contribution to the literature

Research in the development of economic understanding originated in the context of children's understanding of society in general, and in the early 1980s, emerged as a domain-specific area of socialization. However, as Webley & Lea (1993) assert, economic socialization can and should be shaped by approaches in other domains of children's understanding of society. Barrett & Buchanan-Barrow (2005) describe emergent themes in the literature of children's understanding of society across various domain-specific content areas that could affect the research agenda in economic socialization. The authors begin by emphasizing a drastic shift in the literature away from Piagetian-type stages, and towards the following four areas: first, the role of indirect sources of knowledge including parents, peers and formal instruction; second, sociocultural factors; third, naïve (also called folk or lay) theory frameworks; and fourth, the role of children's emotions in motivating development of societal understanding. Webley (2005) extends these themes to the study of economic socialization and advocates for research in economic education to align with these

themes by adopting a naïve theories framework, incorporating more experiments within methodologies, collaborating with economists, and utilizing children as co-researchers. My study will contribute to the literature by applying a naïve theory framework and by addressing the following limitations in prior studies: the narrow definition of what constitutes an economic concept, and a focus on knowledge and understanding over behaviors.

Economics is the study of how individuals, groups, and societies allocate scarce resources; a market system is one way of deciding how to allocate resources. Most authors in the field of economic socialization have limited their investigations of economic socialization to the development of children's understanding of market systems. Authors looked for evidence that children could describe the relationship between consumers and producers in a market system including buying and selling goods and services, use of financial institutions, and to a smaller extent macroeconomic concepts of inflation and the money supply in market economies. However, this represents a limited view of economics. The market system is only one solution to the problem of scarce resources. Additionally, most prior research assumes only adults faced the problem of scarce resources. Given this perspective, it was logical to examine how children came to understand the ways in which adults addressed the problem of scarcity. However, scarcity is a problem faced by all individuals, including children (Meszaros & Evans, 2010). Children experience scarcity when there are six swings but seven children who want to swing. They experience scarcity when there is one pair of scissors and two children need to cut out shapes. When considered broadly, children face economic problems long before they earn their first paycheck and have to decide how to spend it. Children have an

autonomous economic world, “the world of child-child economic relations” (Webley, 2005). This study will focus on economic problems faced by children, especially when these problems are solved outside of the adult economic world. Through ethnographic methods, I will identify economic problems that are important to children and document how children understand and solve these problems.

The second limitation of previous research is its focus on children’s knowledge and understanding. Research has concentrated on what children know about economic concepts and their ability to explain economic events. Questions like ‘what is inflation?’ and ‘what would happen if the government gave everyone more money?’ assess children’s knowledge of inflation and an understanding of the effects of an increase in the money supply. This study will shift the focus from what children know and understand to how they behave and how they explain their behaviors. This shifts the objective of my research in two ways: away from the adult world and towards the child’s world, away from knowing and towards doing. Based on economic problems I identify through ethnographic methods, I will further investigate children’s stated and observed behaviors using adaptations to experimental economics games. A naïve theory framework is complementary to this focus.

Naïve theories include knowledge of concepts, unobservable constructs or processes, and cause-and-effect explanations of events (Wellman & Gelman, 1998). I will examine what children know about resource allocation as well as the cause and effect relationships they assign to the economic events important to them. Because naïve theories are often implicit (Barrett & Buchanan-Barrow, 2005), children may not be able to explain their theories if asked directly. Through ethnographic observation I hope to infer what these theories about resource allocation are, and through

experimental economics games, I hope to test and revise my inferences. The following section describes the purpose as well as research questions that guide my study.

Purpose

The purpose of this mixed methods study is to investigate children's naïve theories about resource allocation for resources over which children exhibit control, ranging from complete control (ownership), to temporary or partial control. In this multiphase design, there are two overlapping phases conducted over an academic year. These phases are: Phase 1: An Ethnographic Exploration of Children's Autonomous Economic Systems, and Phase 2: An Experimental Economics Approach to Children's Choices and Behaviors. In Phase 1 I collected qualitative data, and in Phase 2, I collected qualitative and quantitative data concurrently from a subsample of Phase 1 participants. I used analysis of Phase 1 qualitative data to create an initial theory of children's naïve theory of economics. At this point, Phases 1 and 2 overlapped as the data collection and analysis in Phase 1 continued when Phase 2 commenced. In Phase 2, I developed variants of classic experimental economics games to test and refine the theory posited in Phase 1. Phase 2 involved two experimental games as well as a survey in the second half of the school year. The experimental economics games in Phase 2 captured qualitative data from interviews and observation, as well as quantitative data from outcomes of the games and choices participants made during the games. By utilizing a multiphase mixed methods design, I created theory, developed methods for testing and refining that theory, and present a revised theory of children's naïve theory of economics created from rich qualitative and quantitative data sets. The qualitative data contributes to insights about children enacting their culture, while the quantitative data isolates elements of the culture and provides

additional evidence about resource allocation choices. Specifically, this study addresses the following three research questions:

1. What theory(ies) do children have about resource allocation?
 - i. What kinds of resources do kids allocate?
 - ii. How do kids define the rules guiding resource allocation decisions?
2. How are children's naïve theories about resource allocation similar to and different from children of different ages within the same setting?
3. To what extent can experimental economics capture evidence of children's naïve theories about resource allocation?
 - i. How do children's choices in experimental economics games compare to behaviors observed in their autonomous economic systems?
 - ii. What differences and similarities exist in the choices children of different ages make in experimental economics games?

Chapter 2

MIXED METHODS DESIGN

This study consists of two phases, Phase 1: An Ethnographic Exploration of Children's Autonomous Economic Systems, and Phase 2: An Experimental Economics Approach to Children's Choices and Behaviors. Figure 1 details the chronology, procedures, processes, and relationship between the phases.

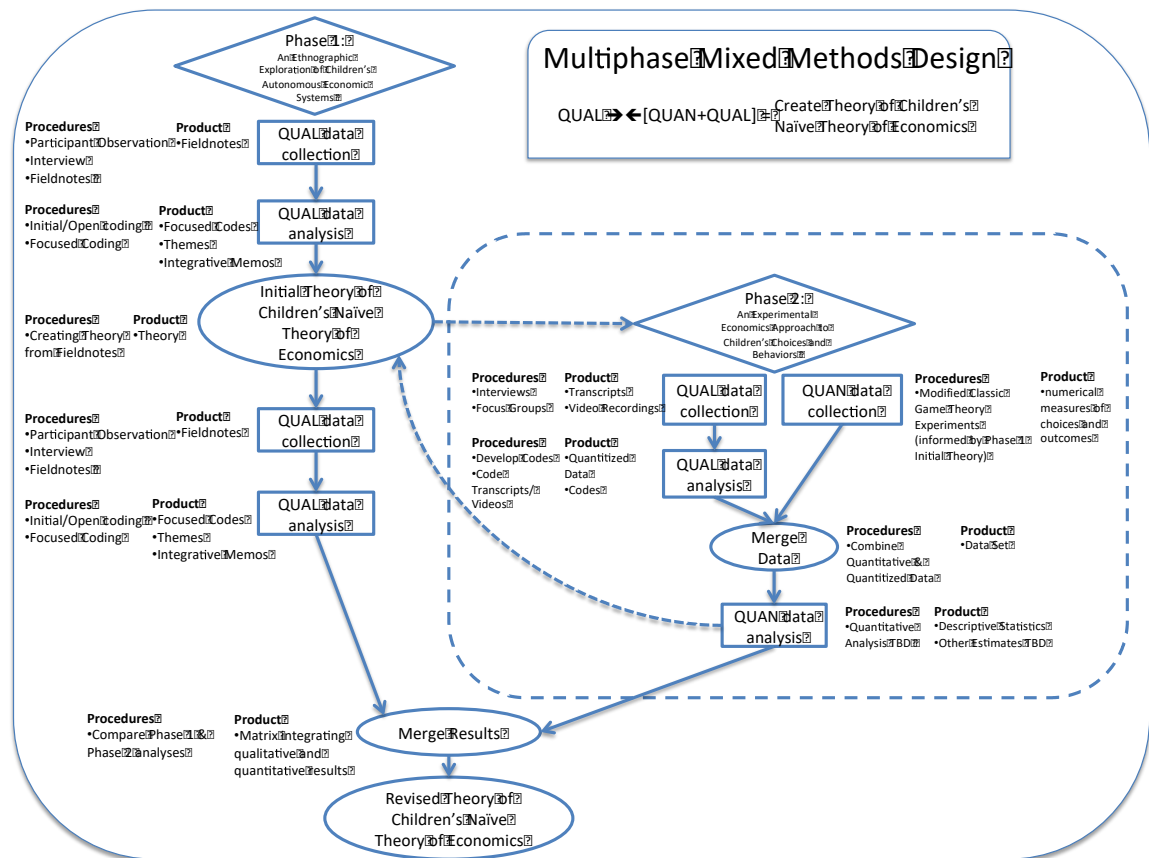


Figure 1 Mixed Methods Procedural Diagram

Equation 1 presents the multiphase design using mixed methods notation.

$$QUAL \rightarrow \leftarrow [QUAL + QUAN] = Create Theory \quad (1)$$

Phase 1 takes an ethnographic approach to studying the economic world of children. This phase is represented in Equation 1 by the initial *QUAL*. The economic world of children is not solely a progression towards understanding and enacting the adult economic world. It is important to investigate the economic world that children construct themselves (Webley & Lea 1993). This economic world is influenced by the adult economic world, but also includes behaviors, beliefs, and institutions that would be unrecognizable as part of the adult economic world, behaviors like swapping food at lunch, or sharing a classroom box of crayons. Thus, by acknowledging that children construct economic systems distinct from adult systems, we recognize that instead of looking for children's understanding of adult systems, or looking for evidence of adult economic behaviors in children, we can look for the ways in which children solve economic problems of resource allocation, and the ways in which they assign meaning to economic interactions.

I analyzed Phase 1 field notes and analytical writings to create a theory of children's naïve theory of economics. Children's naïve theories about economics exist, but as these theories explain economic events in a child's economic world, a world to which adults do not have full access, these theories are unknown to adults. Therefore, I used grounded theory to analyze data collected from ethnographic observation to create a theory of how children theorize about their economic world, or how they "predict, construe or even explain in coherent and principled ways" resource allocation (Inagaki & Hatano 2002).

This theory informed Phase 2, a series of two experimental economics experiments modified to be culturally and developmentally appropriate. In Figure 1, I denote this relationship with the dashed line connecting “Initial Theory of Children’s Theory of Economics” to “Phase 2”.

The procedures for the games played in Phase 2 incorporated interviews, surveys, and video recordings to capture stated preferences, stated motives, and perceived motives of others. As the qualitative and quantitative strands in Phase 2 are captured concurrently and have equal importance, this phase is represented in Equation 1 by the $[QUAN + QUAL]$. I employ the double arrows between the phases to denote the recursive nature of the phases. While initially Phase 1 informs Phase 2, the results from Phase 2 will inform the continuing collection and analysis of data in Phase 1. Thus further data collection and analysis in Phase 1 will reflect analysis from Phase 2.

The remainder of this section is devoted to detailed descriptions of Phases 1 and 2. I begin with a description of the school context for Phase 1, followed by a description of the participants, researcher positioning, and close with data collection and analysis. Next, I describe the participants, procedures, and analyses for Phase 2. The methods presented in this chapter are intentionally brief. Complete descriptions are included in the three subsequent chapters, the first focusing on Phase 1 and the second and third each focusing on a sub-study of Phase 2.

Phase 1: An Ethnographic Exploration of Children's Autonomous Economic Systems

Context/setting and timing

This study took place in an elementary school in the Mid-Atlantic region, which I will call Calvin Elementary & Middle School (CEMS). CEMS is located in a suburban community but is part of a district that serves approximately 16,300 students from both urban and suburban areas. In the 2015-2016 school year enrollment at CEMS was 981 students in kindergarten through eighth grade, with approximately equal distribution of students across grade levels. The racial/ethnic composition of the school is 76.4% White, 8.2% Hispanic/Latino, 6.4% Asian, 5.0% African American, and 4.1% other (including Native American, Hawaiian, and mixed race). Low-income students account for 11.6% of the total student body. A student is identified as low-income if he or she receives either Temporary Assistance for Needy Families (TANF) or Supplemental Nutrition Benefits Program (SNAP) benefits. English language learners account for 3.3% of students, and 8.5% of students are classified as Special Education. For the 2014-2015 school year, seventy-nine percent of students in fourth grade met state standards for reading achievement, 63% for mathematics, and 83.9% for social studies. Science achievement is assessed in fifth grade, and 75.9% of fifth-grade students met the state standard for science achievement.

The school strongly emphasizes academic achievement as well as building a strong community among students, teachers, and staff. The students participate in monthly school-wide meetings that celebrate students who demonstrate school values of respect, readiness, responsibility, and academic commitment each month. School-wide activities during common times, like lunch, are designed to develop and emphasize these values.

The school was selected because it has a strong community within the school. I believe the strong school community was beneficial in observing children's naïve theories of economics. Economic systems are social systems, and the community at CEMS hopefully extends to the students' formation of economic systems.

Participants

I selected to focus Phase 1 on a class of second-grade students and a class of fourth- grade students. I selected these grades because they represent the early and late elementary school in this district. I have opted to observe two grades in order to investigate the continuity of naïve economic theories within the same community. I followed these two classes of students throughout their day from arrival to dismissal. Although a majority of my time was spent with the two identified classes, I also had the opportunity to observe children in other classes and grades during common times like lunch and recess.

At the beginning of my study, I observed each day school was in session. I used this time at the beginning of the study to learn how the school and teachers structure the school day. As Thorne (1993) notes, she developed an understanding of the best times to observe target behaviors as the school year progressed. For my research questions, these were times when children were more self-directed: lunch, recess, and small group instructional time. I limited my observations to these times once I identified times and days I was most likely to observe target behaviors.

I began Phase 1 of data collection on October1, 2015; initially I observed the fourth- grade class, and then began observing the second-grade class in late October. During October, I observed each day school was in session; in November, I reduced my observations to four days per week. The combination of observation during the full

school day and writing field notes at the end of each day is mentally taxing. Observing four days per week, and taking one day per week to review my field notes and to write analytical memos was a good balance for both me and my data collection. Once Phase 2 began, my observation schedule changed to accommodate conducting interviews and experiments, and I observed one to two days per week until the end of the school year in June 2016.

Researcher positioning

I introduced myself to the district and school as a Ph.D. student who is interested in understanding how children think about economics, and how thinking develops as they get older. While there are no immediate benefits to the school and district for participating, I explained that education researchers have used this type of research in the physical and life sciences to develop curriculum that improves students' learning. My primary focus was on children's interactions with each other, not on interactions between adults and children or between adults.

With respect to my positioning with students, I took a reactive least-adult role. Mandell (1988) identified the least-adult role as an adult who does not take on a role of authority, but participates with children as a child. Corsaro (2003) defines a reactive role as one where the researcher waits to be approached and asked to participate, but otherwise makes herself available at the edges of children's activities joining in when invited to do so. I separated myself from the other adults in the school by dressing more similarly to students (jeans/t-shirts/fleece jackets) and actively chose to situate myself with students in the student areas of classrooms, cafeterias, and common areas like playgrounds. I also avoided any activities that would align my role with that of a teacher or instructional aide (i.e. assisting students working in small

groups, monitoring students during lunch or recess). Additionally, as some student behaviors of interest, for example swapping food at lunch, were against the rules, I did not intervene when students broke school rules unless I thought the student was putting herself or others in danger of serious injury. For example, I would not intervene in a disagreement over one child taking another child's pencil, but I did intervene in a clear example of bullying and physical intimidation by telling the perpetrator that he was not in "our" class and he should go back to his class's line.

Data collection and analysis

My primary source of data was participant observation and field notes. Throughout the day I jotted notes. Jottings focused on sensory details of key events as well as key words, phrases, or actions I observe. Where and when I jotted notes depended on the appropriateness of stopping to write in each situation. In second grade, for example, the kids were very curious about anything that I wrote, so I made it a point to only write when I could do so without being noticed. In fourth grade however, the kids did not seem to notice whether I was writing or reading, so I wrote notes while sitting in open areas of the classroom. When I was invited to participate in activities with either the second- or fourth- grade kids, I never took notes during the activities. I waited until afterwards so as not to interrupt my participation. I expanded jottings to field notes at the end of each school day. Field notes focused on descriptions of each day's observation including sketches of scenes, episodes of actions unfolding during a brief period of time, and field note tales that represented a compilation of interconnected episodes and scenes. These descriptive writings served as data for the analytic writing process.

I used grounded theory and open coding to develop initial codes and themes. From these themes, I created theory about children's naïve economic theory. A code map describing my analytic process from field notes to theory is included in Appendix A. A more detailed description of participants, methods, and analysis for Phase 1 is included in Chapter 3: Ethnography. This theory informed the choice of classic experimental economics games included in Phase 2. Participants, procedures, and analysis of Phase 2 is described below.

Phase 2: An Experimental Economics Approach to Children's Choices and Behaviors

Participants

For Phase 2, I expanded recruitment to the other second- and fourth-grade classes at CEMS. I recruited beyond the two classes in Phase 1 for two reasons. First, for the Social Network Analysis portion of the study my goal was to collect responses from 40% of the kids in each grade in order to allow assumptions about the social network for all kids in the respective grades (Cairns, Perrin, & Cairns, 1985; Vu & Locke, 2014). Second, the results from Phase 1 were based primarily on interactions I observed in one classroom of second-grade kids and one classroom of fourth-grade kids. I wanted to expand beyond this initial sample to look for the broader generalizability to the school population. For these reasons, I recruited from the second- and fourth-grade classes I observed during Phase 1, and I contacted the other second- and fourth-grade teachers, requesting permission to recruit from their classes as well. As a result, two additional second and two additional fourth-grade teachers agreed to participate. I recruited kids from each class and for those students who gave verbal assent, I sent information letters, surveys, and consent forms home to

parents/guardians. Participants were included in the study if I received parent assent and child consent.

Participants, n=85, include children from six classes at CEMS, three second-grade classes and three fourth-grade classes. The sample includes n=37 second-grade students (35.6% of all second graders) and n=48 fourth-grade students(37.8% of all fourth graders).⁵ The participants were 55% female, and 8% were only children. The average age of the second and fourth-grade participants was 8.15 years (98 months) and 10.2 years (121.9 months) respectively. Although the US Census Bureau treats Hispanic as separate from race/ethnicity, the state in which I conducted my research includes Hispanic as one of eight mutually exclusive race/ethnicity categories. For consistency, I have adopted the state's standard for reporting. In this sample, all participants who identified as Hispanic also identified as white and are therefore removed from the white category and added to the Hispanic category. Participants were 74.1% White, 3.5% Black/African American, 9.4% Asian, 8.2% Hispanic, 1.2% Hawaiian/Pacific Islander, and 3.5% other (including mixed race). In order to control for income differences within the sample, I used US Census data to identify the median household income in each participant's census tract. I used participant supplied home addresses to identify census tracts, then used the American FactFinder (The United States Census Bureau, 2016) to identify 2014 median household income for each census tract. All incomes are in 2014 inflation adjusted dollars based on the 2010-2014 American Community Survey 5-year estimates. The median income for all participants was \$87,500, with a minimum of \$37,500 and a maximum of \$137,500.

⁵ Although this sample is less than my goal of 40% participation from each grade, I am still able to draw conclusions about the social network as perceived by these participants.

Table 5 contains complete sample demographic characteristics. The second- and fourth-grade samples were not significantly different for any demographic characteristics other than age and number of years attending CEMS. Table 6 presents differences in means for second- and fourth- grade participants.

Procedure

Based on the initial theory of kids' naïve theory of resource allocation created in Phase 1, I developed two sub-studies in Phase 2. The first sub-study was a multi-recipient dictator game and the second sub-study was an autonomous spending experiment.

The multi-recipient dictator game was a multistage experiment. In the first stage, kids completed a Social Network Analysis (SNA) survey. Based on analysis of kids' responses, recipients were selected for the second stage, the multi-recipient dictator game. In the second stage, kids earned candy and had the opportunity to share the candy with both anonymous and named recipients. After playing the game, kids answered interview questions about their choices. A more detailed description of the procedure for both the first and second stages is included in Chapter 4: Multi-Recipient Dictator Game.

Table 5 Sample Descriptive Statistics by Grade

	Second Grade (n=37)			Fourth Grade (n=48)		
	n	M(SD)	Frequency	n	M(SD)	Frequency
Age Months	36	97.78 (3.77)		48	121.88 (3.93)	
Age Years	36	8.15 (.31)		48	10.16 (.33)	
Gender	37			48		
Male	19		51.4%	19		39.6%
Female	18		48.6%	29		60.4%
Number of siblings	37	1.84 (1.42)		48	1.81 (1.63)	
Years at BSS	36	2.58 (.77)		48	4.33 (1.14)	
Race/Ethnicity	37			48		
White	31		83.8%	39		81.3%
Black/ African American	1		2.7%	2		4.2%
Asian	3		8.1%	5		10.5%
Native Hawaiian/ Pacific Islander	0		0%	1		2.1%
Other	2		5.4%	1		2.1%
Hispanic	4		10.8%	3		6.3%
Median Income	35	\$ 89,5556.66 (\$ 25,432.98)		48	\$ 89,770.35 (\$ 28,286.31)	

The second sub-study, the autonomous spending experiment, incorporated two elements: a survey about book fair purchasing behavior, and a mock-store field experiment. The book fair survey asked students about their planned purchasing behaviors prior to the book fair, and then their actual purchasing behaviors immediately following the book fair. In the mock-store field experiment kids were given money to spend at a mock-store. Kids in the treatment condition were told the money was theirs, and thus they could keep any unspent money. Kids in the control

condition were told the money was not theirs, therefore they had to return any unspent money. After playing the game, kids answered interview questions about their choices. A more detailed description of the procedure for both the first and second stages is included in Chapter 5: Autonomous Spending.

Table 6 Test for Differences in Sample Statistics by Grade

	Difference in Means	df	p
Age Months	-24.01	82	< .001
Age Years	-2.01	82	< .001
Gender (female)	.285	83	.285
Number of siblings	.025	83	.940
Years at BSS	-1.75	82	< .001
Race/Ethnicity			
White	.03	83	.765
Black/African American	-.01	83	.721
Asian	-.02	83	.722
Native Hawaiian/Pacific Islander	-.02	83	.783
Other	.03	83	.417
Hispanic	.05	83	.454
Median Income	-213.70	81	.972

Note: n=85

Analysis

As both sub-studies in Phase 2 incorporated qualitative data from interviews, I began analysis by reading interview transcripts and using a grounded coding scheme to develop themes with respect to choices and explanations for those choices. I used

emergent themes to develop codes and quantitize the qualitative responses. I then merge the quantitized and quantitative variables for each sub-study into a combined data set. I used the merged data set to compare group means as well as in predictive models, to predict choices and outcomes in each sub-study. A more detailed description of the data analysis strategy for each sub-study is included in Chapter X: Multi-Recipient Dictator Game and Chapter X: Autonomous Spending respectively.

Merging Phases 1 and 2

The culmination of this study is merging the analysis of Phase 1 with the analysis of Phase 2. The selection of experiments in Phase 2 was dependent on initial analysis of Phase 1, however, the final revised theory of children's naïve theory of economics will be a result of merging qualitative analysis from Phase 1 with quantitative analysis from Phase 2. Merging analysis from both phases allows for multi-faceted comparison of the results and a richer interpretation of findings.

Chapter 3

RE-DISCOVERING NEVERLAND: AN ETHNOGRAPHIC PORTRAIT

"Peter," she said, faltering, "are you expecting me to fly away with you?"

"Of course; that is why I have come." ...

"I can't come," she said apologetically, "I have forgotten how to fly."

-- J.M. Barrie, Chapter 17: When Wendy Grew Up, Peter Pan

Introduction

"Hey!" Jaden whispers excitedly into Chloe's ear. "Hey! You know what they call me?" Chloe doesn't seem to notice the boy whispering loudly as she waits patiently for reading time to start on the carpet with the other kids in her second-grade class. But Jaden is persistent, "You want to know what my nickname is? You want to know what they call me?" Still no response from Chloe. Jaden is not dissuaded. "They call me Big Balls Jaden!". At this, Chloe looks over, her face inquisitive. Jaden beams with pride at his nickname, then turns away to talk to the other kids next to him on the carpet.

The world of kids exists within the grown-up world, but the kids' world is often just out of sight of the grown-ups who surround it. What grown-up knows that Jaden tells people his nickname is "Big Balls Jaden"? Or that using "exploding gummy bears" is not how you play family the "right" way? Or that having \$150 makes you "stinkin' rich"? Or that one ice cream bar from the snack line can be traded for 10 packs of gummies? We used to know these things, but as we grow up, we slowly leave the world of our childhood behind and excitedly join the world of the grown-ups. And

just like Wendy grew up and forgot how to fly, we forget how the world of childhood works when we grow-up.

This ethnography is a journey, not to remember what I have forgotten as a grown up, but to learn how the economic world of kids works. Because just like Neverland changed when Wendy grew up, the world of childhood today is sure to be different than the world of my childhood 25 years ago. I embarked on this journey at an elementary through middle school located in the Mid-Atlantic region. I was a participant-observer in two classes at the school: a second-grade class and a fourth-grade class. I focused my observations and field notes on interactions between kids, specifically as those interactions related to economic problems important to kids and the ways in which they approached those problems.

Previous researchers have extensively examined how kids “grow up” and join the adult economic world. This process happens gradually, and involves both cognitive development and socialization. From a cognitive development perspective, kids progress towards understanding the adult economic world as they move through Piaget’s stages of development, gradually moving towards understanding more abstract concepts. From a socialization perspective, kids first understand the adult economic world through a social lens, then, around adolescence, shift to view the economic world through a self-interested lens. This shift aligns kids’ thinking about economic problems with adult thinking about economic problems. While the body of literature is extensive, it almost exclusively focuses on how kids understand the adult economic world, without acknowledging the existence of the economic world of kids.

I contend that the economic world of kids is separate from, but influenced by the adult economic world. The limited work dedicated to exploring the economic

world of kids has demonstrated that kids experience the problems of resource allocation, just like adults, but that these problems do not concern buying groceries, deciding which job offer to accept, or how to save for retirement. Therefore, as a first step in understanding kids' economic world, we need to understand the economic problems kids identify as important, and the ways in which kids solve these economic problems. It is also important to acknowledge that kids live among adults and are continually exposed to the adult economic world. This exposure has two effects. First, the adult economic world influences the economic world of kids. Kids incorporate elements from the adult world, like money, into their world. Second, kids make sense of the adult world by applying the rules and norms of their own world to that of adults. This second effect results in naïve theories about the economic world of adults that are inconsistent with expert economic theories. By understanding how the economic world of kids works, we can better understand the development of kids' naïve theories and guide them towards expert understandings.

In this chapter, I argue that kids allocate scarce resources amongst themselves using their own system of rules about resource allocation which are negotiable and guided heavily by social networks. I further develop the economic world of kids by demonstrating that kids are not ignorant of the adult economic world; however, they apply their own rules and values to the adult world in constructing their understandings of it. The chapter begins with a description of the setting and methods, and continues with sections focusing on the structure of kids' economic world and kids' understanding of the adult economic world. I end with a discussion of implications for future research.

Setting

This study took place in an elementary school in the Mid-Atlantic region, which I will call Calvin Elementary & Middle School (CEMS). Descriptive statistics for the school are provided in the Methods chapter. CEMS is located in a residential area, and is bounded by a park on one side. The property has two playgrounds, one for younger kids and one for older kids, as well as athletic fields that are used by both the school and the local community. The building is typical of other elementary and middle schools in the area. Just inside the main doors, is an open entryway with a small sitting area, an aquarium, and a “discovery corner” with bean bag chairs and a three dimensional tree sculpture big enough for a couple of kids to sit in the hollow of the trunk. One corner of the entryway has been converted into the school store which is open on Monday and Wednesday mornings.

Just past the entryway, the school has a main office suite where the school administrative assistants and administrators have offices. The teacher lounge and copy room are also adjacent to this office suite. In addition to classrooms, the school has an auditorium, cafeteria, gymnasium, music and band rooms, art studios, and a library. All of the spaces in the school are bright and clean and the equipment available for staff and kids is up to date and in good working order. For example, the library has a technology room with enough computers for a full class of kids. The art studio has a kiln, and each classroom has a mobile microphone and sound system as well as SMART Boards. The school is a two story facility, with first floor dedicated to kindergarten through third grade and the second floor dedicated to fourth through eighth grade. During the year, the school was undergoing upgrades to the HVAC system and four classes at a time rotated out to mobile classrooms behind the school

by the playground. These classrooms, while smaller than the interior rooms, contained the same equipment as available in the indoor classrooms.

My observations at CEMS focused primarily on two classes, a second-grade class and a fourth-grade class. These grade levels were selected because they represent early and late elementary within the district. By selecting a grade from early and late elementary school I maximized opportunities to observe age level differences in kids' behaviors. I began observations in October and continued through to the last day of the school year.

I began by observing only the fourth-grade class, as a second-grade teacher had not yet consented. In the third week I received permission to observe a second-grade class. For the remainder of the year I split my time between the two classrooms depending on each class's schedule. During the first half of the year, I observed at the school four to five days per week. Beginning in January, I reduced observations to 3 days per week while I spent time developing Phase 2 of my study. Once I started running the experiments I had developed for Phase 2, I then reduced my observations to 1 to 2 days per week through the end of the school year.

In the next two sections I describe the second- and fourth-grade classroom settings including the physical and social environments each teacher created for her respective class of students.

The Second Grade Classroom

The second-grade classroom is located on the first floor. The walls are filled with cues for schedules, routines, procedures, and learning goals. The classroom has a wall of windows facing the trees that border the school property. The window sills are

stacked with boxes of supplies and books. There are also several rolling book shelves perpendicular to the window wall.

The back wall is lined with a whiteboard and bulletin boards. The whiteboard had pictures of each kid. Underneath the pictures, kids had written their names on a sentence strip. Below the whiteboard and bulletin boards, shelves line the wall. There is a kidney bean shaped table and chairs along the back wall where Mrs. Gerard meets with reading groups. In one corner, is a reading nook and a table with two computers for students to use. The other corner is set up as a classroom library, lined with book shelves and several different kinds of seats for kids to sit on including rocking chairs, small yoga balls, and standard plastic and metal school chairs.

The wall opposite the windows is lined with shelves and cabinets filled with supplies and materials. A few feet from the wall, the cubbies where kids keep their jackets and backpacks are lined up parallel to the wall. The kids' desks are arranged in two long tables in the middle of the room. The kids in this class all sit on yoga balls instead of chairs. Globes hang from the ceiling above the kids' desks, each labeled with a different continent or ocean. The kids' desks are labeled with their names and each kid has a variety of possessions on his or her desk including water bottles, pencil cases, and tokens. Mrs. Gerard uses tokens as part of a behavioral management system. She has a variety of small objects like animal figurines, slinkies, maracas, and decorative paperweights that she allows kids to select from for positive behaviors like remembering to have your parent sign your agenda, or bringing in a can of gravy for the Thanksgiving food drive. The kids can keep these items for the day, then at the end of the day all tokens are returned. The next day the process starts over again. There are

also special tokens like a magic eight ball, or a glass dolphin sculpture, that kids can earn for especially good behavior like answering a challenging math problem.

The front wall of the room has a SMART Board, whiteboards, and bulletin boards. In one corner is the teacher's desk and in the other corner more shelves with supplies and a kid's sized bicycle on a stand that allows it to be used a stationary bike. Throughout the day, each kid permitted five minutes to ride on the bike while reading a book of their choice. At the front of the room, under the SMART Board, is a large carpet with a circle of low wooden stools. The carpeted area and stools are used for morning meeting, as well as "guest readers" and "guest writers". Guest readers and writers are activities where kids have an opportunity to read aloud to the class from either a book of their choosing, or from their own writing.

Mrs. Gerard, the second-grade teacher, has been a teacher for over 20 years. She has taught at multiple elementary schools, but has been at CEMS for several years. Mrs. Gerard often talks about the climate she wants for her classroom. She wants to create a place where kids work together. She feels it is important to help kids develop both academically and socially. To support social growth, she schedules time at morning meetings for kids to share both problems and compliments. There is a "problem agenda" and a "compliment agenda". Kids are encouraged to write about unresolved problems they are having with another kid in the class in the problem agenda, and to write about something positive another kid in class has done in the compliment agenda. Each day it is one kid's job to read any new entries in the problem agenda, then the person who wrote the problem and the person about whom the problem was written have a chance to elaborate on their point of view. Mrs. Gerard then guides the class in a discussion of how to solve the problem. She generally allows

the kids to offer solutions, and come to a resolution without her intervention. Another kid reads the new entries in the compliment agenda. If a kid is written about, he or she then says thank you to the person who wrote about them.

Mrs. Gerard also stresses values of equality and communal property. Not only do seating assignments switch, but the kids also physically switch desks and yoga balls at the end of each marking period. The token system also reinforces communal property because kids have possession of the token for the day, then put it back at the end of the day allowing another student to select it the next day.

The Fourth-Grade Classroom

The fourth-grade classroom is located on the second floor. The walls and bulletin boards are decorated in bright colors with inspirational quotes and posters. The room feels open and spacious. It has one wall of windows that look out on the trees that border the school property. Below the windows are shelves filled with books. Kids who finish their work early are encouraged to read silently, and are allowed to take home books from the class library.

The front wall has a SMART Board, whiteboards, and bulletin boards covering the entire wall. A large carpet at the front of the room is used for the morning meeting, for whole group instruction at the SMART Board, and also as a flexible workspace kids can choose to use when working independently or in small groups. Ms. Estes does very little whole group instruction, and throughout the day kids have multiple opportunities to move around the classroom using clipboards as writing surfaces to work either individually or in small groups to complete activities. This independent working time provided opportunities throughout the day for me to observe interactions between kids.

Along the wall opposite the windows are cubbies for kids to keep their coats and backpacks, and storage cabinets for art supplies and games. The back wall has a whiteboard and bulletin boards. Ms. Estes's desk is in the back corner of the classroom along with a kidney bean shaped table and chairs that she uses for small group instruction.

The desks are arranged into three "tables" in the middle of the room. Most students have stacks of belongings on their desks. These items are almost permanent features remaining on their desks even after Ms. Estes asks the kids to clean off desks; their water bottles, pencil cases and reading books stay on top of the desks. Some students have other things on their desks as well like lip balm and bundles of sharpened pencils held together with hair bands. Each student desk is identified with the kid's name on a laminated paper star.

The fourth-grade teacher, Ms. Estes has been a teacher for 5 years, and has been at CEMS for four of the five years. Ms. Estes tells both the kids and me that fourth grade is her favorite grade to teach. She tells the kids that if the principal let her pick any grade to teach, she would pick fourth grade. Ms. Estes told me that she thinks fourth grade is great because fourth-grade kids are increasingly independent of the teacher. She likes encouraging them to collaborate when they are learning, and to work in small groups where they practice and master new tasks. She also gives the kids lots of leeway in solving interpersonal problems. She is slow to intervene when kids have disagreements, and tries to allow kids to work things out for themselves. She is; however, very aware of the social lives of the kids in her class. She knows who is getting along with whom, and who is less likely to be included in group activities. She knows who hangs out with whom after school, and what characterizes each kids'

home life. While she highly values encouraging kids to be independent, she does not use this as an excuse to be ignorant of her kids' social, emotional, and academic needs. She gives hugs, braids hair on costume days, offers after-school help, asks about sports games, and supports kids who have traumatic events happening at home.

My Entry into CEMS

My first step in gaining access to CEMS was through a colleague and friend, Rachel, who I knew from my time working at the CEMS school district's office. Rachel told me the process for conducting research in the district and made introductions for me with the individual responsible for approving research at the district level. Once my proposal was accepted by the district, the second step was obtaining permission of the school principal. Rachel facilitated a meeting between myself, the school principal, and the two vice principals. The third step was obtaining permission from teachers to observe their classrooms. The principal contacted teachers in the fourth and second grade whom she felt would be amenable to having me observe throughout the year. I met with each of the fourth- and second-grade teachers independently to discuss the purpose of my observations as well as to answer any questions they might have. The fourth step was informing parents of the kids in the two target classes about my presence and purpose in their child's classroom. I sent an introduction letter that included a brief overview of my study to the homes of all parents whose children were in the two classes.

I introduced myself to the district, school staff, and parents as a Ph.D. student who was interested in understanding how children think about economics, and how thinking develops as they get older. While there were no immediate benefits to the parents, school, or district for participating, I explained that education researchers

have applied this type of research to the physical and life sciences in order to develop curriculum that improves students' learning and that I was intending to apply the research to the improvement of economic education. My primary focus was on children's interactions with each other, not on interactions between adults and children or between adults. However, I recognized that children's actions are often reactions to rules and expectations set by adults both within and outside of the school. For example, some parents and schools have rules against trading food at lunch. Children may choose to follow the rule or not, and it would be important to investigate the meaning children assign to those choices and actions. While I acknowledged that children's choices did not occur in a vacuum, my focus was on children's behaviors. When the children's behaviors were in response to adult messages, I focused on the meaning children assigned to the adult messages.

I introduced myself to the fourth-grade kids the day before I started observing. Ms. Estes first told the class my name and that I was going to be spending time with their class throughout the year. I told the kids I was a student at University of Delaware, and that I was interested in learning about how kids play and learn together. I told them I would be spending time in their class and with a second-grade class at their school for the whole year. I told them they would mostly see me watching what was going on in the classroom or at lunch or at recess. I told them that they might see me writing in my little notebook, but that I wouldn't write down their names, and that if I told other people about what I learned I wouldn't use their names and no one would know who they were. I gave the kids a chance to ask questions and a few of the fourth-grade kids made comments about knowing people who went to University of Delaware, or asking me to repeat why I would be watching them.

I introduced myself to the second-grade class during morning meeting the first day I observed in their class. Mrs. Gerard asked me to sit on one of the stools on the carpet next to the kids. She included me in the greeting where each kid looks into the eyes of the kid next to him or her and says “Good Morning” and the kid’s name, “would you like a hug, handshake, or a high five?” The other kid gets to say which type of greeting he or she would like. This starts with Mrs. Gerard greeting the kid sitting on one side of her, and continues around the circle until the last kid greets Mrs. Gerard. After the greeting, Mrs. Gerard told the class that I would be spending time with their class and gave me an opportunity to talk to the kids. I repeated the same message I had said to the fourth-grade kids. The second- grade kids asked many more questions. They wanted to know my favorite color, if I was a mom or a teacher, what kinds of things I would be watching, and whether or not they could read the notes I took in my notebook.

Methods

In both classrooms I attempted to be seen more as kid than an adult. At first I wore jeans, a t-shirt and Toms (low profile, canvas slip-on shoes). I selected the clothes I wore based on observing the kids the day I introduced myself to the fourth-grade class. Later, when I started observing the second-grade class, a couple of the girls asked me at lunch if I was a mom. I said no, and they said I looked like a mom. I asked why they thought I looked like a mom, and they told me because I had mom shoes, and they were too clean. Also, I wore a headband. I asked what kind of shoes kids wore and they told me “sneakers.” I asked them how kids wore their hair, and they told me pony tails. After that I wore sneakers every day and wore my hair (too short to wear in one ponytail) in two pigtales like some of the girls did.

In addition to wearing clothes to make me more kid-like, I also sat in areas of the classrooms that were designated as “kid” spaces. In the fourth-grade classroom, most of the time I sat on the floor, or on a kid-sized chair near where the kids were sitting. In the second-grade classroom, the teacher gave me an empty student desk and a yoga ball. She also invited me to join in the circle during morning meeting. This meant that I participated in the greeting with the rest of the class. In the fourth grade during morning meeting, I was not invited to sit in the circle, so I sat just outside of it and did not participate.

Throughout the day I situated myself near groups of kids, but never inserted myself into their activities. I waited to be asked to join in activities. Additionally, I did not intervene in any discussions or disagreements or help them with tasks they couldn't complete. This was easier to do in fourth grade because the kids did not directly ask me to help. However, in second grade the decision to not insert myself into their activities was more challenging. Second-grade kids would sometimes ask me to help them open a package at lunch, tie a shoe, read a challenging word, or solve a math problem. My usual response was to just shrug and say “I don't know how”. Eventually the second-grade kids stopped asking me to help and would instead ask other adults or even other kids.

In the fourth-grade class, none of the kids spoke to me until the fourth day I observed. On my fourth day of observing, Ana and her friend Logan (a kid in another class) asked me at recess to move out of the way of the game they were playing. That same day at lunch, Julian, who was sitting across from me, told me that he had just traded ice cream for gummies. The girls he had traded with looked down at their lunches as he told me about the trade. I asked him where he got the ice cream from,

and then commented that his gummies were the same brand as my yogurt. The conversation ended there. After those first few days, the kids gradually talked to me more and more. A few fourth-grade girls who were not part of the larger established friend groups in the grade, Ana, Mackenzie, Priya, Nora, Maria, and Leah, regularly talked to me about things they were doing, or asked me questions about things I like. Most fourth-grade kids, however, did not regularly engage with me in conversation.

In contrast to the how the fourth-grade kids approached me, the second-grade kids spoke to me and included me in their activities from the first day I observed. During “guest writers” time William asked if Mrs. Gerard could make a popsicle stick with my name on it so that I could participate by answering questions if my stick was drawn just like the kids in class. Later, at recess, Mason and William asked me to play ball tag with them. I ended up playing with Mason, William, Jacob, and Elizabeth. This was characteristic of how the second-grade kids interacted with me. While the fourth-grade kids never invited me to participate in games or activities at recess, the second-grade kids always asked me to play. In the fourth-grade class, the same few girls consistently talked with me, and the other kids occasionally talked to me. In the second-grade class, most of the kids approached and talked to me regularly with the exception of Jacob, Jaden, Mila, and Peyton. These four would play with me if I was part of a group, or participate in an activity I was also participating in, but on no occasion did they initiate conversation or activities.

The art and gym teachers invited me to participate in class activities and I did. I played games in gym and made projects in art. I also looked at books during library and read quietly on the carpet with the kids who had checked out books. A few weeks into my observation of the fourth grade, Priya asked if I was going to check out books.

I told her I didn't know how. She said I needed a library account from Mr. Scheck, the librarian. I talked to Mr. Scheck about this later that day, and he set up an account for me so that I could check out books. From then on, when I was with the second and fourth-grade classes I checked out books that were on their respective reading levels. When the kids saw me reading, this would often motivate them to ask questions about the book I had picked, or to tell me their opinion of the book. I think this inclusion in the unified arts classes helped the kids see me as more than just an observer. They started to see me as a part of their class: not a teacher, not a student, but a part nonetheless. In these unified arts classes kids were more likely to engage with me, using the activity we were all working on as a conversation starting point. In art for example, kids would comment on how my coil pot looked, or offer suggestions for how I could make it better.

I think the differences in the way the kids interacted with me in the second and fourth grades can be attributed to age differences as well as differences in the way the respective teachers related to me. First, it may be that the second graders saw me as exciting because I was an adult who was willing to play with them without telling them what to do, redirecting their behaviors, or setting rules. In contrast, the fourth graders seemed to view me with suspicion as an adult who was not behaving like adults should behave. Second, it may be that Mrs. Gerard took steps to actively integrate me into classroom activities, while Ms. Estes carried on with her class as usual, allowing me to observe versus inviting me to participate. These two approaches had different advantages. In the fourth-grade class, it was easy for me to move between groups of kids and observe what they were doing. In the second-grade class; however, it was harder to move between groups because kids would ask me to be part

of their group, which would make it challenging to go observe a different group through completion of the activity. However, being included in the second-grade activities gave me greater access to their conversations. They openly had conversations with me present and made no attempt to lower their voices to make it difficult to hear the content of their conversations. In the fourth-grade class, being an observer meant I had to find ways to sit close enough to hear quiet conversations without being obtrusive. I often pretended to be reading a book while I listened to the conversations around me. This seemed to help, but it was not a perfect solution as looking down at my book sometimes prohibited me from seeing all that was going on around me.

I used constant comparative analysis, a process of open coding, theme identification, and theory development, to analyze my field notes (Glaser & Strauss, 1967). A description of my coding process and a figure depicting my code mapping is included in Appendix A.

Section 1: Kids' Economic World

The kid's economic world, like the adult economic world, is dominated by the problem of scarcity: there isn't enough for everyone to get as much as they want, so we have to make choices about who gets resources. Adults in the American mixed economic system generally use market mechanisms, like price, to determine how resources are allocated. However, kids' system of resource allocation is distinct from the system of the adults around them. In this section I discuss the kinds of resources kids allocate, and the ways in which resources are allocated. Then I discuss the rules guiding allocation focusing on negotiation and the impact of the social network on rule negotiation.

What resources do kids allocate?

Kids allocate two types of resources: possessions and access. Possessions fall into two categories: possessions over which kids have permanent control and possessions over which kids have temporary control. Often when kids possess resources, they have ownership, or permanent control, over them. In the fourth-grade class, the student of the week is encouraged to bring items from home to “share” during morning meeting. Sharing is a kind of show-and-tell where the student of the week describes the item, then passes it around the circle for each student to look at. The following exchange took place during sharing time:

Scarlett, the student of the week, brought in her piano books, two stuffed animals, and a suction bot. She described the significance of each of her items as they were passed around the circle. The other kids in the class were intrigued by the suction bot, a figurine made of cubes that had suction cup hands and feet. As it was passed around Maria said, “This is neat can I have it?” Scarlett said “no” and Maria passed it to the next person in the circle.

The items Scarlett brought came from Scarlett’s home, and this helps establish her ownership and permanent control over the possessions. It is clear that Maria recognizes Scarlett’s control over the items. Maria acknowledges Scarlett’s control twice: first, she requests that she be able to keep the item, then when Scarlett denies her request, she willingly passes it to the next kid in the circle. If she had doubted Scarlett’s control over these items, she would not have so quickly given up her own temporary control of the suction bot.

Kids do not always have ownership, or permanent control, of the items they have the power to allocate, but they do have temporary control over the items. The

following exchange took place between two fourth-grade kids as they were waiting to be dismissed for lunch:

Sarah reached over and put her hand on Luke's desk. Luke said, "off my desk" drawing out the word *desk* for emphasis. He repeated this a couple of times until Sarah, keeping her hand firmly on his desk, said, "It's not yours". "Do you see my name on it?" Luke replied as he pointed to the star with his name on it. Sarah retorted, "It's not yours, it's the school's." Luke responded, "It's mine right now." This ended the conversation and Sarah pulled her hand back.

Although Luke's desk is clearly school property (this is acknowledged by both Luke and Sarah), and therefore does not belong to Luke in the way adults understand ownership, Luke defines the desk as his possession because it is labeled with his name and he has use of it. His use of the desk gives him control over it, and therefore the ability to decide how others can access it. Although Sarah initially challenges Luke's control, she eventually acquiesces, conceding through withdrawing her hand that Luke does indeed possess the desk, if only temporarily, and has control over its allocation.

Kids not only allocate possessions, but also access to physical and social spaces. As with possessions, physical spaces do not need to be owned by the kid controlling allocation. Some locations within the classrooms are preferred by students, for example the cubbies in the fourth-grade classroom and the reading nook in the second-grade classroom. Kids can be allowed or excluded access due to size or design of areas. The following exchange took place between a group of second-grade boys who had just been given permission to find a quiet place in the classroom to read or write in their journals:

Some kids, including Landon, went to the little reading nook in the back corner of the classroom. The nook provides a high level of privacy as two mobile bookshelves act as “walls” dividing it from the rest of the classroom. The kids had added a chair to block off the entrance to the nook. When Mason tried to enter the nook, Landon said the nook was private, “sorry”. Mason said, “There’s room for one more right?” While there was room for another body, the group didn’t allow him to come into the nook, and Mason walked away to find another place to work.

The boys who arrived at the reading nook first controlled access to the space, thus deciding how access to the space would be allocated. They further ensured their control by placing a chair in front of the entrance. Even though there was enough space for Mason to join the group, access was controlled by the boys who had arrived first. This control over access to the space was acknowledged by the Mason. Even though he recognized there was a physical space for him, he left when told he would not be allowed in.

Kids not only allocate access to physical spaces, but to social spaces as well. Allocating access to social spaces can be subtle, or overt. The fourth-grade teacher has a rule that the first person in line is the line leader, and the second person in line is the door holder. The door holder is responsible for holding the door open until the entire class has passed through, then they join at the end of the line. The third person in line now becomes the second, and is responsible for holding the next door the class comes too. The following exchanges took place in the hallways as the fourth-grade class was walking to and from their classroom one day:

Priya was holding the door and holding up her hand and hi-fiving each person as they walked by. She held her hand up the whole time, but not everyone gave her a

high five. Later, Camilla was holding a door and was giving high fives until the end of her friend group (Lincoln, Noah, Jack, Elijah, Hailey), then she put her hand down. As we were leaving lunch I also saw a kid from another class hi-fiving while holding the door.

This is an example of subtle allocation of social access. Priya was denied social access by the kids who refused to hold up their hands for a high-five. By keeping their hands down, these kids were excluding her from their social group. In the same way, Camilla was allocating social access to Lincoln, Noah, Jack, Elijah, and Hailey, while denying it to those who passed her once she put her hand down. This exchange was a public acknowledgement of who had and did not have access to social groups, it was a way of allocating recognition to some kids and denying it to others.

Although the previous exchange was a subtle example of allocating social access, sometimes the allocation was much more overt. In the following exchange, recess for the second grade has just started and the kids were figuring out how they were going to spend the next twenty minutes:

A group of second-grade kids wanted to play hide-and-seek and asked me to play with them. Although it started as a group of five, Mason, William, Eliana, Brooklyn, and me, soon Arianna joined, then Hannah, then kids from other classes. Hannah decided we would use a counting game to decide who was “it”, but she was having a hard time because there were so many people in the circle. She kept losing count and starting over. Eliana got frustrated and started angrily announcing that there were too many people and that only six people could play. When she started yelling this, some kids said “okay”, and left. When others would come up and ask to play Eliana would announce again, “You can’t play!”

This control of social space, the access to a game of hide-and-seek, was much more overt than the high-fives in the hallway. Eliana, as one of the original members of the group, decided she was going to control access to the social space, and decide how access to the space would be allocated. She excluded other kids from the space based on the order in which they had joined the group. Those who joined after Hannah and Arianna were told they were not welcome. Her ability to control access was recognized by the students who voluntarily left when admonished to do so.

How do kids allocate resources?

Kids allocate resources that they have temporary and permanent control over. These resources may be physical possessions, like toys and school supplies, or they might be intangible, like access to a physical or social space. When viewed from the perspective of the kid who has control over the resource, the ways in which resources are allocated can be divided into two categories: voluntarily and involuntarily. Resources that are allocated voluntarily may be shared, loaned, gifted, or traded. Resources that are allocated involuntarily may be taken or stolen.

When a resource is shared, the kid who controls the resource simultaneously accesses the resource with the other kid in the transaction, or the resource is divided between the kids. Sharing, unlike trading, does not involve a tangible exchange of possessions. Sharing often happens with food at lunch. For example, two fourth-grade kids, Scarlett and Ana, were sitting next to each other at lunch. Scarlett shared the frosting from her Lunchable with Ana by letting Ana dip her finger in the frosting. In this example, Scarlett had control over the access to the frosting, and she allowed Ana to access it while Scarlett was accessing it as well.

Sharing is not always simultaneous though, it might be a division of the resource. For example, the second-grade class had a candy corn guessing contest, and the winner of the contest got to keep the jar of candy corn. Elizabeth, the winner of the contest, took the jar of candy home the day she won, but brought it back to school with her the following Monday. About half of the candy corn was gone. She announced to the class that she was going to give everyone in the class three pieces of candy corn during snack time. She told the class she had already eaten a lot of candy and wanted to share. In this instance, Elizabeth is dividing the resource among the recipients, not simultaneously consuming it with them.

When sharing occurs, there may or may not be an expectation that the possession be returned. In the previous examples, Scarlett and Elizabeth were not expecting the food they shared to be returned; however, in the following example there was a clear expectation that the resource would be returned. The kids in the fourth grade class were each coloring a diagram of the plant life cycle. Camilla had a set of colored pencils that she shared with Hailey and Sarah. The colored pencils were placed in the middle of the three girls' desks and each girl took a pencil to use it, returning it back to the central pile when they were done. At the end of the activity, Camilla put her colored pencils back in her pencil box. Unlike the food examples above, there was a clear expectation understood by all three girls that the pencils would be returned to Camilla, the owner of the resource.

While sharing can be permanent or temporary, lending, another kind of voluntary transaction is always a temporary allocation to another kid. Kids in both grades often asked to borrow the supplies another kid had, but was not using. These supplies include glue sticks, scissors, whiteboard markers, and erasers. In every

instance of lending, the borrower always returned the item. Lending is different from sharing in that it does not involve simultaneous use, and the lender and borrower have a shared expectation that the good will be returned.

In contrast to lending, gifting involves a permanent allocation of a resource to another kid. Gifting often represents more than just the utility of the resource that is allocated. For example, they may signify the status of a relationship. The following exchange occurred between two fourth-grade boys at the beginning of recess during the week of the fall book fair. One of the two boys, Vishal, was moving back to Pakistan with his family, the following week:

At recess a boy from a different class came up to Vishal and tried to give him a book about dinosaurs with a little container on the front cover with plastic fossil replicas of dinosaur teeth in it. I heard him telling Vishal that he had bought the book for him at the book fair. Vishal told the boy he couldn't take the book because it was the boy's book. The boy insisted telling him he purchased it for Vishal. Vishal finally took the book and the two boys started looking through the pages and talking about the different types of dinosaurs in the book. After a few minutes the other boy left and went to play on the playground. Vishal told me he was just going to sit on the bench and read his book. I told him that sounded like fun. Later in class I noticed that Vishal had put the tooth necklace around his neck.

The unnamed gift-giver is clearly not expecting his resource to be returned. Vishal is hesitant to take the book, and gives the other boy several chances to change his mind and keep the book. Vishal knows he is moving, and is clearly uncomfortable with the permanence of receiving such a valuable possession. However, the other boy knows Vishal is moving away, and most likely is giving the gift because of the

impending move. The gift is not just something useful, like a colored pencil to color a diagram, it seemed to carry a deeper meaning, possibly a representation of the boys' friendship and the giver's desire to have Vishal take a part of their friendship to Pakistan with him.

Trading is distinct among the four forms of voluntary resource allocation in that there is a mutually agreed upon, and usually immediate, exchange of two resources. The following exchange took place between three second-grade kids as they were completing their morning work:

Chloe wanted a purple pencil that Jaden had in his pencil box. She offered to trade him a green pencil for his purple pencil. Jaden agreed, and the two kids traded pencils. Brooklyn wanted to trade with Jaden as well. She offered him a "brand new glue stick" for a pencil. She even showed him the glue stick with the lid off to prove it was brand new. Jaden shook his head no, and didn't trade with Brooklyn. A few minutes later, Brooklyn said "Can I please have one and pay you tomorrow?" Jaden said, "No". Brooklyn then said, "I'll pay you a dollar" and Jaden replied, "No".

There were two potential trades in the preceding interaction: between Chloe and Jaden, and between Jaden and Brooklyn. Both Chloe and Brooklyn wanted to trade for one of Jaden's pencils, but only one of the trades was successful. The trade between Chloe and Jaden was successful because both kids agreed to the terms of the trade. Chloe suggested the terms of trade and Jaden accepted. The trade between Brooklyn and Jaden was not successful. Brooklyn offered what she thought was a valuable resource, a brand new glue stick or a dollar, but Jaden did not agree with the terms, so the trade did not take place. Trades usually follow this pattern: one kid offers a specific resource in trade for another resource. However, sometimes, a kid will offer

a good and ask what others will trade for it. For example, Jack, a fourth grade kid, announced at lunch that he was willing to trade his bag of chips and asked other people what they would give him in return. He got a few offers, but did not accept any of them.

While trades usually involved a simultaneous exchange of resources, sometimes one resource is exchanged between kids with the promise of a future exchange. During snack time in the fourth-grade class Leah was eating a little snack bag of mini blueberry muffins, and Julian told her he would buy her an ice cream at lunch if she gave him a muffin. Leah didn't respond right away, but a few moments later she handed him a muffin and repeated that he was going to have to buy her ice cream from the snack line. He said okay. In this exchange, Leah traded a resource, a muffin, to Julian with a promise that he fulfills his half of the exchange, the ice cream, later.

Resources aren't always allocated voluntarily by the kid who has possession of the resource. Involuntary resource allocations occur when a kid assumes possession of a resource that is either temporarily or permanently controlled by another kid. This includes taking and stealing. Both taking and stealing are done without the consent of the kid who possesses the resource, but stealing often implies a permanent resource allocation, while taking is temporary. For example, the fourth-grade kids often played with Pokémon cards in the first half of the school year. In one conversation, as kids compared the cards they had, Brayden flipped through the pages of his card binder and pointed at one of the cards saying, "This is the one I stole from (inaudible)". In Brayden's instance of stealing, he has placed the stolen card in the binder along with all of his other cards, an indication he has claimed permanent ownership of the card.

On the other hand, taking may be considered a temporary involuntary allocation. In the following interaction, the fourth-grade kids are working in small groups to learn different methods of solving multiplication problems. Each group had one sheet with the instructions and problems they had to solve. Elijah, Logan and Nora were all working together:

Elijah had the sheet of paper with the instructions and problems on it and was reading to his group and telling them what to write. Elijah was frustrated with the method they had to use. He kept commenting about how frustrated he was and how hard it was. While he was erasing and complaining, Logan took their group's instructions and started working on the next problem. When Elijah looked up to read the instructions, he couldn't find them. He looked around and his eyes settled on Logan who was holding the paper.

Elijah: "Did you take that from me?"

Logan: "So"

Elijah: "So nobody takes things from me."

Elijah took the paper back and Logan just looked at him but said nothing.

In this exchange, Elijah had control over the group's instructions sheet, and Logan in Elijah's words "took" the sheet from Elijah. Logan acknowledges that he took the sheet with his comment "so", inferring that he did take the sheet but that it was inconsequential. Elijah is able to get the instructions sheet back from Logan, making the involuntary allocation temporary, unlike the stealing example above which was a permanent involuntary allocation.

Stealing may also be defined as an instance of involuntary allocation that makes a kid particularly upset while taking is a less serious offense. During indoor

recess in the second-grade class, kids were playing with a popular marble run activity where kids connect different shape pieces to create a three dimensional “run” for a marble to travel from the top of the structure along a path to end at the bottom of the structure:

There were two groups of kids playing with the marble game. Elizabeth was playing with one group. Her group had fewer marbles than the other group. She kept saying, “They have more than us!” and “That’s not fair”. She tried to take some, but was stopped by the other group. Elizabeth was visibly angry, scowling, and unable to enjoy playing with her group. She said the other group had “stolen” the pieces and when she couldn’t get the other group to give her group some pieces eventually told Mrs. Gerard, “They have way more than us!”

Elizabeth has defined the other group’s behavior as stealing, not taking. While it doesn’t appear that the kids in the other group intend to keep the pieces (as the game belongs to the teacher), Elizabeth’s inability to get what she wants and thinks is fair, has raised level of frustration, and she has declared the pieces “stolen” instead of “taken”. On the other hand, when the kid who has had his or her possessions involuntarily allocated is not as upset, might refer to his or her possession as “taken”. The distinction between these two types of involuntary resource allocation is not precise, and that may be because the distinction is fluid in the minds of kids. They may be synonymous for some kids, and very different for others.

How do kids negotiate the rules of resource allocation?

Although resources are allocated among kids both voluntarily and involuntarily, this section focuses on the rules guiding voluntary allocation for two reasons. First, most of the allocations I observed were voluntary, and second, by

definition, involuntary resource allocation defies the rules because the person with control over the resource has no say in how the resource is allocated. Although there are some stable underlying tenets guiding resource allocation among kids, the rules about resource allocation in the economic world of kids are negotiable.

The underlying tenets about resource allocation usually apply when control of a resource is undefined or undetermined. For example, at recess there are a limited number playground balls, swings, and other desired equipment and before the start of recess, no kid has control over these resources. As kids in both the second- and fourth-grade classes head out to recess, they walk silently down the hallways until they get to the double doors that open to the outside. As soon as they come to the doors, some students run as fast as they can. There is a little pushing past each other to get to the swings or to the playground equipment or the balls. This is an example of the “first one gets it” rule. If you get a soccer ball first, it is your ball for the entire recess. If you get a swing, it is yours to swing on until you are done.

Recess is not the only time kids employ the “first one gets it” rule. Kids will often tell each other, “I got here first” in order to claim the rights to control resources inside the school building as well. In the fourth-grade classroom, there are only a few whiteboard erasers available for kids to use when they are solving math problems on the individual whiteboards. When the teacher announces that they need to get markers and erasers and come to the carpet for math, kids jump up and rush to the erasers first because they know that if they don’t get an eraser first, they will be stuck using their hand, or an old sock. In the second-grade classroom wooden stools are set up at the front of the room for circle time. However, there are not enough stools for everyone so

the teacher has included four chairs in the circle as well. When it is circle time, there is a rush to sit on the chairs and claim control over them.

Although “first one gets it” is the rule I saw most commonly used, I did observe other rules for resource allocation. One of these alternate rules was using games of chance. In games of chance, resources are allocated by the flip of a coin, by selecting a kid whose name is randomly drawn from a tub of popsicle sticks, or by playing a counting game like Tarzan the Monkey Man. Another rule was to divide the resource equally. In the candy corn distribution described earlier, Elizabeth allocated an equal number of candies to each person in the class. I only observed this rule about equal allocation being applied in the second-grade class, never in the fourth grade class.

Although the above tenets are applied to some situations of resource allocation, much of the time, rules about resource allocation are negotiable. Even the “first one gets it” rule is negotiable. In the following exchange Mr. Scheck, the librarian, has finished up the read-aloud portion of library. He tells kids they now have time to either renew their books or check out new books. Some students go to renew, some head to the shelves, and others go to the computers to use the catalog. I wander around the shelves looking at books and observe the following conversation between Sarah and Chloe:

Sarah and Chloe are fighting over a small, old hardbound book in Sarah’s hand.

Chloe: “I looked it up on the computer...Julian and I were looking it up”

Sarah: “I got it first”

Chloe: “That’s why he (Mr. Scheck) got it out cause Julian and I were looking for it. Give it!”

The argument continues with the girls going back and forth about why they each should have the book. Mr. Scheck walks by as he re-shelves books, hears the argument, but does not acknowledge it.

Sarah: “I’m not fighting about this anymore”

Chloe does not concede. She still wants it and does not give up. She continues exclaiming that she should get the book.

Sarah: “What if we read it together?”

Chloe: “Okay, but who will check it out?”

Sarah: after a moment... “You can, but we have to read it together” and hands the book over to Chloe

Chloe turns to chapter 19, and Sarah and Chloe read aloud together. “Ms. Zars. There’s no Ms. Zars so there’s no 19th floor...that’s it” (*Sideways Stories from Wayside School*, Louis Sachar)

Sarah found the book both girls wanted first, and had taken it off of the shelf. According to the “first one gets it” rule, Chloe should have acknowledged that Sarah had control over the book. However, Chloe disputes Sarah’s right to the book saying that she had been looking for the book, and that gave her the right to the book. The girls are clearly negotiating who gets to check the book out, and in the end come to a solution that allows them both to have access to the resource. They both agree to read the book together. In fact, later that day, as they were walking back from lunch, the two girls were walking next to each other in line and reading out loud to each other.

Not all negotiations end with both kids satisfied. One such example is the negotiation between Brooklyn and Jaden described earlier. Brooklyn has just observed Jaden's willingness to trade his pencil with Chloe for one of her pencils. She clearly believed that Jaden was willing to trade pencils. However, Jaden was not willing to trade with her. She offered a brand new glue stick, and even money, but Jaden did not agree to the trade. Jaden appears to have a negotiable willingness to trade: sometimes he is willing to trade his pencil and other times he is not. Similarly, in the fourth-grade class the kids were completing an activity that required coloring and cutting when the following exchange took place:

Maria (sitting across from Scarlett) asked Scarlett if she could use her tan colored pencil. Scarlett ignored her at first, but Maria kept asking. Finally, Scarlett said, "Use your brown". Then Scarlett took out her beige colored pencil and Maria said, "You have beige?" Scarlett held both the tan and the beige in her hand while she colored with the beige. Maria said, "Can I use your tan? Please please please please?" Scarlett said "No." then Kayla, sitting next to Scarlett said, "She doesn't have to". Maria got up and got a brown colored pencil from the classroom set. A few minutes later, Camilla asked Scarlett if she could use her scissors. Scarlett said she could and handed them to her.

It would seem from the part of this exchange involving colored pencils that Scarlett is not willing to allocate the resources she owns to other people in the class. Maria asks to use a resource that Scarlett is not using, but Scarlett refuses. However, Scarlett is willing to allocate a resource she owns a few minutes later. She allows Camilla to use the scissors she is not using. Scarlett clearly has different rules for how

she allocates resources she owns, therefore these rules are negotiable based on the situation and kids involved.

What is the role of the social network?

While Scarlett's willingness to allocate her resources may seem arbitrary, understanding Scarlett's social network provides an explanation for her allocation rules. In the social network at CEMS, I identified four categories of kids: close friends, central kids, non-friends, and isolated kids.

Scarlett is very close friends with Kayla. They sit next to each other during morning meeting, work together during math, sit next to each other at lunch, and play together at recess. In addition to their strong in-school friendship, Scarlett and Kayla are also friends outside of school. They live in the same neighborhood and talk about spending time at each other's houses. This in-school and out-of-school friendship strongly influences who kids allocate resources to.

Scarlett is not close friends with Camilla or Maria, however, Camilla is a central figure in the class, and in the fourth grade, while Maria is not. Camilla is a member of a group that is recognized and liked by kids not only in her own class, but in other fourth- grade classes as well. Additionally, while most kids have single gender groups of friends, Camilla has groups of female as well as male friends. Camilla's status as a central figure in the class may explain why Scarlett was willing to share with her. Maria and Scarlett, on the other hand, do not spend time together, other than the times when they are forced to by Ms. Estes's assigned seating. Because Maria and Scarlett are not friends, and because Maria is not a central figure in the class, this may explain why Scarlett was unwilling to share her colored pencil with Maria.

In addition to close friends, central kids, and non-friends, there is another category of kid, the isolated kid. In both the second- and fourth-grade classes, there are some kids who seem to exist on the margin. In the fourth-grade class, Ana is one of those kids. Ana does not have consistent visible relationships with kids in her class. This might be because Ana leaves class for pullout instruction in writing, math, and reading. The only times she is with Ms. Estes's class are morning meeting, lunch, science/social studies, and unified arts. This means that for most of the day Ana is in a separate classroom from the rest of her classmates. She is also Latina, and is only one of 6 minority kids out of 28 kids in the class. While none of the kids talk about Ana's lack of time spent in the classroom, or her minority status, it does seem to isolate her from them. The following exchange occurred during library between a central kid, Lincoln, and Ana:

During library, Mr. Scheck divided the kids into two groups. Group One worked on research on the iPads and Group Two browsed and checked out books. Halfway through library, the groups switched. Mr. Scheck had told the kids they should bring their iPads to the check-out counter and then he would distribute them to the second group. However, a few kids just gave their iPad to someone from Group Two who was sitting near them. Lincoln stood up and held his iPad out announcing, "Up for grabs! Anyone? Anyone?" He repeated it a few times, and Ana walked up and reached for the iPad. Lincoln retorted, "Not for you" pulling the iPad out of her reach, then repeating his refrain "Up for grabs! Anyone? Anyone?" and Ana walked away back to her seat. After a few moments, when no one else responded to him, he said, "Okay, you can have it" as he walked toward Ana and handed her the iPad.

Lincoln had control of the resource, and wanted to decide who would have access to that resource next. Although he announces he will give it to “anyone,” it is clear when Ana comes to claim it, that she is not the “anyone” of whom he was thinking. Ana accepts this and walks away. When Lincoln is unable to get anyone else to accept his offer, he decides to give the iPad to Ana. Ana’s status as an isolated kid makes her a second choice for Lincoln when he is making his allocation decision.

There are fewer examples of kids distinguishing between members of their social network when making allocation decisions in the second-grade class. One explanation for this difference could be the influence of the teacher. The second-grade teacher strongly values fairness, equity, and inclusion of everyone. She admitted to me that even though she knows the kids in her class won’t all be friends, no one should be excluded in second grade. For the most part, kids in the second-grade class seem to embody this value. However, there are examples of exclusion based on status. The following exchange took place during reading of the problem agenda at morning meeting. The problem agenda is a place where kids who have an unresolved problem with another kid in class can write the problem down so that it can be discussed and the rest of the class can help them find a solution to the problem.

Brooklyn wrote an entry in the problem agenda about Eliana. Brooklyn reported that Eliana had given her the evil eye and not let her play at recess. According to Brooklyn, Addison (a kid from a different class) and Eliana don’t let Brooklyn, Chloe, and Arianna play with them at recess. When Mrs. Gerard asked Eliana if what Brooklyn said was true, Eliana admitted to both giving the evil eye and not letting Brooklyn, Chloe, and Arianna play with her and her friends. Mrs. Gerard then asked

the class what they thought should happen. Many of them said that Eliana should let Brooklyn play with her, emphasizing that you should play with everyone.

Eliana is a central, or popular, kid in her class. She is also friends with kids who are central in other second-grade classes. This is most noticeable at recess when she plays with kids, like Addison, who most second graders know. Brooklyn, Chloe, and Arianna are all relatively isolated kids in the class. Chloe and Arianna are both quiet in class, and don't actively seek to participate with other kids when given the chance. At recess, Chloe remains isolated, playing or sitting by herself. Arianna, who is very proud to tell you she is from Mexico and that she speaks Spanish, plays with Latina girls from the other second-grade classes; however, she does not play with kids from her class (where she is the only Latina). Brooklyn on the other hand, tries to be included with other kids in class, but does not seem to be well liked, or have a stable group of friends. Eliana's refusal to allow Brooklyn, Chloe, and Arianna access to her game at recess can be understood in terms of each kids' status in the social network. Eliana, a central kid, did not want to allocate any of the social space she controlled to isolated kids like Arianna, Brooklyn, and Chloe.

Summary

Kids allocate scarce resources amongst themselves using their own system of rules about resource allocation which are negotiable, and guided heavily by social networks. The resources kids allocate include possessions and access to physical and social spaces. These resources are allocated through voluntary and involuntary mechanisms. Allocation is guided by a system of rules that are often negotiable. Finally, these rules are strongly related to kids' social networks. Kids at the top of the social hierarchy, identified here as central kids, have more rule-making and

negotiating authority than isolated kids. Additionally, strength of relationship among kids often dictates whether resources will be allocated and under what terms.

Section 2: Kids and the Adult Economic World

The economic world of kids is clearly separate from the adult economic world. Kids allocate different kinds of resources than adults, and have different rules for allocating them. However, this does not mean kids are ignorant of the adult economic world. Kids gain knowledge of the adult economic world in two ways: firsthand from participation as consumers and producers, and secondhand from conversations with adults and other kids.

Secondhand sources of Economic Knowledge

Adults sometimes intentionally, and other times unintentionally, pass on knowledge of the adult economic world to kids. I unintentionally introduced new knowledge to two fourth-grade kids during recess. I was sitting on the plastic curb that surrounded the playground when Ana and Logan came up to me and said “excuse me” telling me they wanted to walk around the curb without stepping off. I told them jokingly that they would have to pay a toll if they wanted to get by. Ana and Logan didn’t understand so I told them that a toll was something they had to pay to get past. They thought that was funny, and that I was going to pay them something. Then Ana realized that they had to pay me. They ran off and told me “Don’t forget to block us again” When they came by again Logan asked me to pay the toll. Ana told him to pay me so he pretended to pay me by reaching out a clenched fist then dropping something pretend into my hand, and I moved my feet. Then Ana paid me, and I moved my feet again. They ran off, and I moved to the grass so I wouldn’t be in the way again. While

unintentional, I introduced the concept of making a payment in order to gain access to a route. As a kid growing up in New Hampshire, where toll roads were common, I was very familiar with tolls. I was also a big fan of the fairy tale, “The Three Billy Goats Gruff” where the goats had to pay a toll to the troll in order to cross the bridge. However, these kids did not have these experiences and therefore did not know what a toll was. By telling them they had to pay a toll, I unintentionally introduced knowledge from the adult economic world of resource allocation where access to a route has to be paid for by those using the route.

Sometimes when adults intentionally share economic knowledge, it is accurate. For example, in the second grade, Josh’s mom was visiting to talk about her job and read a book to the class. After she described her job as an assistant principal, the kids had a chance to ask her questions. The first question was from Hannah:

“Do you get paid at your job?” Hannah asked. Josh’s mom said, “Yes.” Another kid asked, “Who pays you?” and she responded that the school district paid her. Mrs. Gerard interjected telling the class that Josh’s mom was a civil servant, and reminded them that Eliana’s dad, a fireman who had also visited the class, was a civil servant as well. She then asked the kids who paid civil servants. The kids made guesses and one of them said “the government”. After prompting the students but not getting the correct answer, Mrs. Gerard reminded the students that she got a paycheck, but that taxes were taken out of her check and this money went to the government to pay for roads, fireman, schools, police, and other things. A few moments later Josh’s mom called on Eliana. Eliana repeated Mrs. Gerard’s description of how money goes from people’s paychecks to the government to Josh’s mom’s paycheck and then asked if she was correct. Josh’s mom said she was.

Mrs. Gerard and Josh’s mom intentionally gave the kids knowledge not only about who pays Josh’s mom, but also where the money to pay her comes from. In this example, the kids were given accurate, albeit simplified, information about how the adult economic world works, but that is not always the case.

In the fourth-grade class during the multiplication unit, the teacher gave the kids math problems to solve involving money. The math problems incorrectly used the terms price and cost interchangeably. The problems also incorrectly labeled all money received by the seller as profit, and did not take into account any of the costs the seller incurred in order to provide the product. While these inaccuracies did not impact kids’ learning about math, kids internalize these messages about the adult economic world and this may impact how they construct understandings and make sense of how adults allocate resources.

In addition to learning from adults about the adult economic world, kids can also learn about the adult economic world when other kids share their experiences. Kids talk about their experiences shopping with their parents and what their parents do for work. They also share more general beliefs they have about the role and function of money. For example, during morning meeting Mrs. Gerard had been reading a story about Madame Curie and asked the kids why Madame Curie did not stop working as a scientist after she had won a Nobel Prize. The question required the students to recall information from the story about Madame Curie’s drive and curiosity as a scientist. However, Hannah responded,

“So she wouldn’t get poor.” Mrs. Gerard looked over at her and said, “Really?” Hannah responded, “If you run out of money, you end up on the street.”

Then Hannah looked over at Evelyn, who was looking back at her, and Evelyn confirmed Hannah’s explanation saying, “It’s true.”

In this exchange Hannah and Evelyn shared their knowledge about poverty and homelessness with the rest of the kids in the class. Whether or not this information was accurate, it does represent knowledge about the adult economic world that kids are sharing with each other.

Firsthand Sources of Economic Knowledge

In addition to learning about the adult economic world from adults and other kids, kids learn through participating. Kids participate in the adult economic world when they engage in transactions that involve adults. In these transactions, kids take on the roles of both producers and consumers. Regardless of their role, the kids I observed were enthusiastic participants in the adult economic world.

Consumers in the Adult Economic World

One opportunity kids had to be consumers was at the school store. The store was open Monday and Wednesday mornings before the start of the school day. Kids looked forward to the mornings when the school store would be open so they could purchase scented erasers, colorful pencils, and bookmarks. Both second- and fourth-grade kids would show off items they had purchased from the store, describing the items’ features as well as allowing other kids to touch the purchases.

The fall and spring book fairs were also opportunities for kids to be consumers. These events generated lots of excitement and were highly anticipated by kids in both grades. The week before the book fair, the kids watched a promotional video produced by the publisher that included interviews with authors, and animated previews of

books the publisher wanted to highlight. The students were excited about some of the books that they recognized from different series (i.e. Dork Diaries and Goosebumps). In the week between seeing the promotional video and their day at the book fair, the fourth grade kids talked about what they wanted to purchase. Ana told me she wanted to buy the book “Nightmare” by Jason Segal. Priya asked me if I was going to buy anything at the book fair. I told her I didn’t know. She replied that she wanted to buy a Goosebumps book. Noah and Lincoln joined in on the conversation telling me that “regular books (paperback) probably cost five dollars” and “hardback books cost like ten dollars”. On the day of the fall book fair all of the fourth-grade kids brought money to spend.

Kids also have an opportunity to be consumers during lunch time each day. The lunch system at CEMS allows parents to prepay for lunch by loading money onto a kid’s lunch account, or for kids to pay for lunch in cash. While there are always multiple meal options for kids to purchase including a hot entrée option, a sandwich option, and a “lunchable” option, there were also several a la carte options including chips, ice cream, cookies, carbonated juice, and milk. Kids were allowed to choose how they want to spend their money, there was no restriction that they had to buy a meal.

All three of these opportunities to be consumers at school, the school store, the book fair, and the lunch line, allow kids to participate in the adult economic world where price determines how goods, services, and resources are allocated. Kids who have money to purchase items are able to obtain those items. Unlike their economic world, this economic world is guided by fixed rules. There is no negotiating about transactions with the cashiers at the book fair and school store or with the lunch lady.

Producers in the Adult Economic World

In addition to opportunities to participate as consumers, kids also participate as producers, although there are fewer opportunities for them to engage in this way. For example, one fourth grade kid, Scarlett, excitedly told her friend Hailey about the time last year when she made a folder by folding a piece of paper in half and decorating it. Kayla, one of her best friends, wanted the folder so Kayla's mom paid Scarlett a dollar for the folder. Scarlett expressed surprise that Kayla's mom would pay for the folder. It was clear that Scarlett felt she had been paid more for the folder than it was worth, and she was proud.

A second example of kids acting as producers in the adult economic world came from Evelyn, a second grade kid. She told me a story during indoor recess one day about the time she and her friend had earned twenty dollars from selling jewelry. She and her neighbor friends made jewelry with beads and sold it on her driveway to people in the neighborhood. She told me that her mom had texted the whole neighborhood at once to tell them about the jewelry. Evelyn was very proud of herself. She said they sold to lots of the people in their neighborhood. I asked her what the price was for the jewelry. She told me it was "a good and fair price". I asked her what that meant. Evelyn struggled at first to explain what she meant, but eventually was able to communicate that it was a fair price because the jewelry "wasn't sparkly or anything, it was just beads so we sold it for a fair price". I asked her what the price was. At first she told me under five dollars, then she told me one dollar. She told me she and her neighbor friends split the money, twenty for her house and twenty for her friends' house. She said that the \$20 she received was split equally between her and her brother. I asked if her brother helped make the jewelry. She told me "not really" but he helped sell it.

Constructing Understandings of the Adult Economic World

In both Scarlett and Evelyn's stories the kids express pride at having made something and sold it to adults. Both also express surprise at having been able to make as much money as they did. Perhaps their surprise comes from comparing the outcomes of transactions in the adult economic world to the rules kids have for resource allocation in their own economic world. For example, perhaps since Scarlett is very good friends with Kayla, Scarlett might have expected the folder to be a gift to her friend as a token of friendship. Or, if there was going to be a trade, the trade should have been for two resources of approximately the same value. That Kayla's mom was willing to trade a whole dollar for a paper folder is clearly perplexing to Scarlett, who must believe the folder is less valuable than one dollar. In Evelyn's example, she is equally amazed at the amount of money she earns. Unlike Scarlett, Evelyn describes her process for setting the price for her jewelry. She claims she wants a "good and fair price" and that this fairness is derived from the quality of the beads. She does not want to take advantage of people who are trading with her. This is consistent with the rules about resource allocation in the kids' economic world. Kids rely heavily on their social networks to determine rules, and these adults buying from her are her neighbors, part of her social network. She needs to treat them in a "good and fair" way. She needs to make sure the trade is fair.

Kids also apply their beliefs about the role of social networks to their understanding of grown-up jobs. Both fourth- and second-grade kids discussed the inevitability of someday taking on the same jobs as their parents. Mason, a second-grade kid, started a conversation with me at lunch by asking me if I wanted to be a teacher. I told him no. He asked me what I wanted to be. I told him I didn't know and asked him, "What do you want to be?" Mason replied, "I want to play for the

Cowboys like my Uncle! But, I will probably sell beer because my dad does.” This inevitability of his career being determined by what his dad does is consistent with the kids’ economic world where the social network has a strong influence on the rules of resource allocation. Perhaps for Mason, a job is something that is associated with his family relationships, and not a coordination between job seekers and employers.

Even in fourth grade, this belief is still apparent, although it is beginning to shift away from the rules of kid’s economic world towards the rules of the adult economic world. The following exchange took place during art class among a group of fourth-grade kids:

Raj, Rohit, Vishal and Luke were talking during art class as they worked on their coil pots. As they were talking, Rohit said, “My dad used to be an architect”. He repeated this multiple times until Luke and Vishal responded to him. Luke finally said, “So, are you going to be an architect?” Rohit replied, “No, probably not...maybe, maybe not”. Vishal joined in and said that he could be an architect if he wanted to.

In this exchange, it is unclear why Rohit brought his dad’s job up in conversation, but Luke, like the second-grade kid, Mason, associates a parent’s job with the eventual job of his son. Rohit, however, is not sure whether his father’s job will become his own job. This might be due to increased economic socialization and understanding about how adults select their jobs. It is clear that the two boys hold different views of the role of dad’s job in determining the son’s job. Luke still believes, like the second-grade kid, that father and son’s jobs are strongly connected while Rohit believes this relationship is more flexible and not deterministic.

There are other differences between the fourth- and second-grade kids and their understandings of the adult economic world that specifically involve money.

Second-grade kids who use cash to make payments for items they purchase seem unaware of why the exchange is taking place. This can be seen in transactions at the school store and at the book fair. The adults who work at the cash registers seem to follow a script telling each kid, “You are giving me X dollars, and so I am going to give you back X”. They say this as they are taking the kids money, almost as if they are afraid if they don’t the kid will walk away after handing over his or her money before receiving the change. Evidence of this can be seen in another interaction I had with Mason.

When the kids were packing up their backpacks to go home for the day, Mason showed me a crumpled one-dollar bill that he had removed from the bottom of his backpack. He told me that he actually had four dollars in his bag. He smoothed it out and handed it to me saying, “Here, you can have it” I said to him, “Don’t you want it?” and he replied, “No, I don’t need it, I have others”. I asked him where it was from, and he told me from when he purchased his erasers at the school store.

In this exchange Mason does not seem to understand why he received money back after purchasing his erasers from the school store. He constructed meaning about his transaction using the same rules kids use for trades in their own economic world: two people each have something, and are willing to exchange those things. In the kids’ economic world, it doesn’t make sense for a trade to take place, and then one kid gives the other kid more stuff afterwards. In the same way, Mason gave the cashier money, she gave him the erasers. Much to his surprise, she also gave him money. How odd, he must think, that she is giving him money back when that money was his part of the trade.

This belief can also be seen when kids include the adult economic world in their play. During a math lesson in second grade, the kids were practicing addition and subtraction using money. Mrs. Gerard had given each kid plastic coins and a price list. Working in pairs, one kid (the buyer) was supposed to name three things they wanted to purchase from the list, and the second kid (the seller) was supposed to add up the prices and tell the first kid how much money he or she owed. Then the buyer would count exact change and pay the seller. After the transaction was complete the kids would switch roles. I was sitting near Eliana and Chloe while they worked as partners:

Chloe: “I want bananas, carrots, and peppers.”

Eliana: “That’s 115 cents”

Chloe counted out the correct combination of coins to pay 115 cents, set them down next to her on her desk, and then handed two half-dollars to Eliana. I watched the two girls switch roles, and repeat the same process, this time with Eliana handing the same two half-dollars back to Chloe. Confused about why they were trading the two half-dollars back and forth, I asked the girls why they didn’t trade the coins they had counted out.

Eliana: Because they’re mine.

Chloe: Yeah, they’re our coins

The girls tell me that one of each of the half-dollars belongs to each girl, so they just pass the two half-dollars back and forth as they pay for things.

Eliana and Chloe are not willing to give the other the plastic coins they each consider “theirs”. Instead, they have agreed to pass one coin from each kid back and forth every time they complete a transaction. For these girls, it is the transfer of the coins, not the amount of the coins being transferred, that matters. The girls are

unwilling to actually give coins they view as “theirs” in this activity. Perhaps this is because they are not receiving anything in return. This is consistent with the rules in the kids’ economic world. The girls would only be willing to give up their own coins if they were receiving something they valued in return for those coins.

This understanding second-grade kids have of how payments work seems to have disappeared by the time kids are in fourth grade. I observed one transaction at the book fair where a fourth-grade kid gave her money to the cashier and the cashier took it and handed the kid her books. The girl looked puzzled and started to walk away telling her friend that she did not get any change. Her friend encouraged her to go ask the cashier for her change. The girl did go back, but the cashier explained that they rounded all prices up to the nearest dollar and didn’t give out change less than a dollar. The girl looked dismayed as she walked away. It is clear that this fourth-grade kid understood the role of money in the transaction. For her, trades involving money are no longer a one-for-one exchange like they are for the second-grade kids. Instead, currency comes in different denominations and it is possible to pay for a good and expect change in return.

Kids’ consumer behaviors at the book fair had two other interesting features. First, kids seemed to distinguish money by its source and want to spend more of the money if it belonged to their parents. For example, two fourth-grade kids, Hailey and Camilla, were walking around together discussing what they wanted to buy. Hailey told Camilla, “I want to spend all of my mom’s money, but I’m going to save my money.” Camilla agreed with her and told her to “definitely spend all of your mom’s money”. In this example Hailey has divided her money into two piles. In one pile she has her own money, and in the other pile she has money her mom gave her. Although

we might assume she would be willing pool the money together and spend it until the value to her of the things she could buy was less than the value of the money, she did not behave this way. She clearly valued her money more than her mom's money, wanting to save her money and spend her mom's money. Her friend Camilla's immediate and emphatic agreement makes it seem as though Hailey's position is not only understandable, but expected. Second, kids' desire to spend all of their money seemed to be common among both second- and fourth-grade kids. I could hear many students talking about how much they had left and what they could get with what they had left. They would look for things that were equal in price to the amount they had left. Priya, for example was walking around talking out loud to anyone nearby, "What can I buy for \$2? I can't find anything I want for \$2." Priya was one of the students who was trying to spend her money. She had \$5 to spend, and was holding an item that cost three dollars. Priya saw me looking at books at one of the tables and came over to tell me she couldn't find anything she wanted that was \$5. "All of the things I like are like \$5.99 or more." Just like Priya, other kids at the book fair seemed less concerned with an a priori desire for a book than they were with figuring out how to spend all of their money. One explanation for this behavior is that kids do not have many opportunities outside of the book fair to make purchase decisions where there is such a large selection of items from which to purchase. The selection at lunch is just food items, and the selection at the school store is very limited compared to the book fair. A second explanation for this behavior is that kids view money differently based on the source of the money. Perhaps kids believe that money their parents give them will have to be returned if it goes unspent, or perhaps they just value their parents' money differently.

Summary

Although the economic world of kids exists separately from the economic world of adults, kids are aware of the adults' world. Kids learn about the economic world of adults firsthand through participation, and secondhand through information shared by adults and even other kids. However, kids' knowledge of the adult economic world is incomplete. They participate in a limited capacity and the information shared with them is not always accurate. For these reasons, kids rely on the knowledge they have of their own economic world to make sense of the adult economic world. This combination of outcomes from the adult economic world and explanations from the kids' economic world contributes to naïve economic theories that are not aligned with expert economic theories.

Implications and Final Thoughts

Kids have a semi-autonomous economic world that is separate from, but influenced by, the economic world of adults. The semi-autonomous economic world of kids is guided by negotiable rules which are influenced by kids' social framework/network. Kids share, lend, gift, and trade resources among themselves. How they decide with whom to allocate resources seems to be strongly influenced by the social relationship they have with the potential recipients. Close friends or kids who are central in the social network, are more likely to have allocated to them than non-friends or isolated kids. This observation about the connection between how kids allocate and their relationship with the recipient is an area for further investigation. In Phase 2 of this study I design an experimental economics game to deepen my understanding of this phenomenon. Specifically, I am interested in the extent to which kids replicate these kinds of resource allocation decisions in an experimental setting,

and how behaviors in the controlled experimental setting are similar to and different from the behaviors I observed during the school day.

In addition to their own economic world, kids are aware of the adult economic world, and enthusiastically participate as consumers and producers when they have the opportunity to do so. This is especially evident in the eagerness with which they participate as consumers at the school store and book fairs. However, their participation is limited. They can see outcomes of participation in the adult economic world, but cannot observe the rules guiding these outcomes. Consequently, kids use knowledge of how their own economic world works to make sense of the adult economic world. Specifically, kids seem to allocate money differently depending on its source. Money from parents is treated differently than their own money. In Phase 2 of this study, I design a survey and field experiment to further investigate how kids make meaning of money based on its source, and consequently make decisions about how to allocate it.

Kids' own rules for resource allocation and how these rules relate to both their own economic world and the economic world of adults is an area ripe for future exploration. Exploration of these rules and their origins will deepen our understanding of how kids form and develop naïve economic theories.

Chapter 4

SHARING WITH MY FRIENDS, BUT NOT WITH YOU

Introduction

This study is motivated by my observations of kids' sharing behaviors in Phase 1. When sharing, kids appeared to base allocation decisions on the relationships they had with potential recipients. Specifically, recipients who were close friends or who were popular, seemed more likely to receive resources than kids who were non-friends or who were isolated from their peers. I designed a multi-recipient dictator game to further investigate my observation that kids' social networks affected their sharing behaviors.

In this experiment, each participant played two rounds of a multi-recipient dictator game. Each participant earned 10 pieces of candy per round and had the opportunity to keep the candy or share it with four recipients. In one round, the recipients were named and represented the participant's best friend, an acquaintance, a popular same-grade peer, and an isolated same-grade peer. In the other round, recipients were anonymous same-grade peers labeled Students 1 – 4.

This chapter begins with a rationale for the multi-recipient dictator game design, then describes the methods including participants, settings, and procedures. Next I describe the data analysis strategy and results followed by discussion and conclusions.

Rationale

This variation on the classic dictator game was motivated by observed resource allocation behaviors from both second and fourth grade kids. While resource allocation decisions in a market system are often influenced by price or by type of

good, kids in this study seemed to care more about who received the good rather than the origin or price of the good. Specifically, the role of the recipient in the social network seemed to influence who received resource, with close friends and popular kids more likely to receive resources than isolated kids or other peers.

In Phase 1 of this study I observed patterns of sharing behavior that seemed to be dependent both on the relationships between children, and on children's location within the hierarchy of the classroom. Children seemed more likely to share with their friends and with popular children than with non-friends and unpopular or isolated children.

Research in social psychology, specifically in the development of children's prosocial behaviors, has examined children's allocation of resources in dictator games comparing a participant's allocation decisions when they are allocating between themselves and a member of the "in-group" and the "out-group". In-group is defined as an anonymous member of the child's class and out-group is defined as an anonymous child in another class/school. Games provide set allocation schemes as follows (where the first number in the brackets represents what the dictator receives and the second number is the recipient's allocation): prosocial [1,1] or [1,0]; envy [1,1] or [1,2]; and sharing [1,1] or [2,0] (Fehr, Bernhard, & Rockenbach 2008). Using this framework, evidence suggests that a preference for equal division of resources increases with age (age range 3-8 years old), and males have a stronger preference for allocating resources to the in-group than females do (Buttelmann & Bohm 2014). Current research does not address allocation to specific in- and out-group peers. I used SNA to determine named members of in- and out-group as well as to further refine the definition of in- and out-groups to be specific to each participant.

I used SNA to generate independent variables to test a network theory of resource allocation. I hypothesize that the location of a recipient within the dictator's network affects how many resources will be allocated to that recipient. To determine the members of each participant's social network, I conducted a node level analysis of social relations among same-grade peers within the school.

Below I describe the rationale for my choice of resource ownership, type of resource to be allocated, as well as the selection and anonymity of recipients.

Resource Ownership

Although kids have control of resources that they do not own (i.e. teacher provided scissors), I limited my experiment to resources owned and controlled by the kid. Ensuring ownership is important in both adult experimental economics literature as well as in developmental psychology literature, since ownership increases the likelihood participants will allocate resources without consideration for the experiment administrator's preferences (Kogut, 2012).

Food as a Resource

Money is the traditional resource used in experimental economics studies with adults. Because I did not observe kids allocating money, I selected a good I often observed them allocating: food. While sharing and trading food was against school rules, the practice was widespread in classrooms, at recess, and in the cafeteria. Many types of food were allocated including drinks, snacks, fruit, entrees, and desserts, but I selected candy as it is a universally desired good.

Recipients and Anonymity

The classic dictator game has one dictator and one recipient. The dictator receives a specified amount of a resource and decides how he/she would like to allocate the resource between him/herself and the recipient. The recipient is passive in this game, and has no decision-making power. He/she passively receives the allocation without interaction with the dictator. The dictators and recipients are usually anonymous to each other to limit the effects of social influences (Hoffman, McCabe, Shachat & Smith, 1994). In this study, however, I was specifically interested in how kids made resource allocation decisions among peers in their social networks. These allocation decisions often occurred in group settings where kids knew the potential recipients, and had the option to allocate to multiple recipients. I replicated this structure by allowing each kid to allocate resources among four possible recipients, each with a different role in the kids' network. In order to isolate the effect of the role of the recipient in the kid's social network, I kept all dictator decisions anonymous from the recipients. This limited the impact of perceived reciprocity or other types of social pressure on the dictator's decisions. Each kid also allocated to four anonymous same-grade peers in order to serve as a comparison for how allocation decisions are made absent information about the recipient's status in the social network.

Methods

This experiment is divided into two parts. In the first part, I used Social Network Analysis (SNA) to generate independent variables for use in the second part, the multi-recipient dictator game. In the SNA portion of the experiment, participants identified members of their social network within their grade at CEMS. I used the information about each participant's social network to identify specific recipients for

the second part of the experiment, the multi-recipient dictator game. Since the dictator game provides the context for the SNA experiment, I will first describe the setting and procedures for the dictator game, then describe the setting and procedures for the SNA.

Participants

As described previously in the Methods chapter, the sample for Phase 1 included one second- and one fourth-grade class at CEMS as primary participants. However, second- and fourth-grade kids from other classes were observed during recess, lunch, and other common times specifically when they interacted with kids from the target classes. For Phase 2, I recruited participants by sending home letters and consent forms to parents of the kids in the targeted second- and fourth-grade classes from Phase 1. Additionally, I contacted the other teachers in both grades and requested permission to recruit from their classes. Two additional teachers in fourth grade and two additional teachers in second grade agreed to allow me to recruit kids from their classes. Each teacher allowed me to speak to the students in her class to explain what the kids would do if they participated, as well as to explain the benefits, risks, and compensation for participating. Two fourth-grade kids did not give assent, and zero second-grade kids did not give assent.

For all kids who gave verbal assent, I sent home informational letters, consent forms, and a demographic survey to parents/guardians. Parents/guardians had the option to complete the survey online or via paper. A copy of the survey is included in Appendix B. A kid was included in the study if he/she gave assent and his/her parent/guardian gave consent. The sample included $n=37$ second-grade kids (35.6% of all second graders) and $n=48$ fourth-grade kids (37.8% of all fourth graders). The

sample included 38 males (44.7%), and the racial/ethnic makeup mirrored that of the school. Complete descriptive statistics for participants in Phase 2 are presented by grade in Table 5. There were no significant differences in demographic characteristics between grades other than age and number of years the kids had attended CEMS. Table 6 presents all differences in means and significance levels.

Dictator Game Setting

The dictator game was conducted in a private office in the school building. Participants completed the experiment individually. Each session took approximately 10 minutes and sessions were filmed. Participants sat on one side of a desk with a divider between participant and administrator to provide privacy during participant decision-making. On the participant's side of the desk, were one piece each of five different types of candies and an iPad. Types of candies were selected based on observed preferences of second- and fourth-grade students during Phase 1 of this study. The candies included Starburst, Twix, Twizzlers, Dory Gummies, and Hershey's Kisses. All candy was individually wrapped and similarly sized. Figure 2 shows a diagram of the layout.

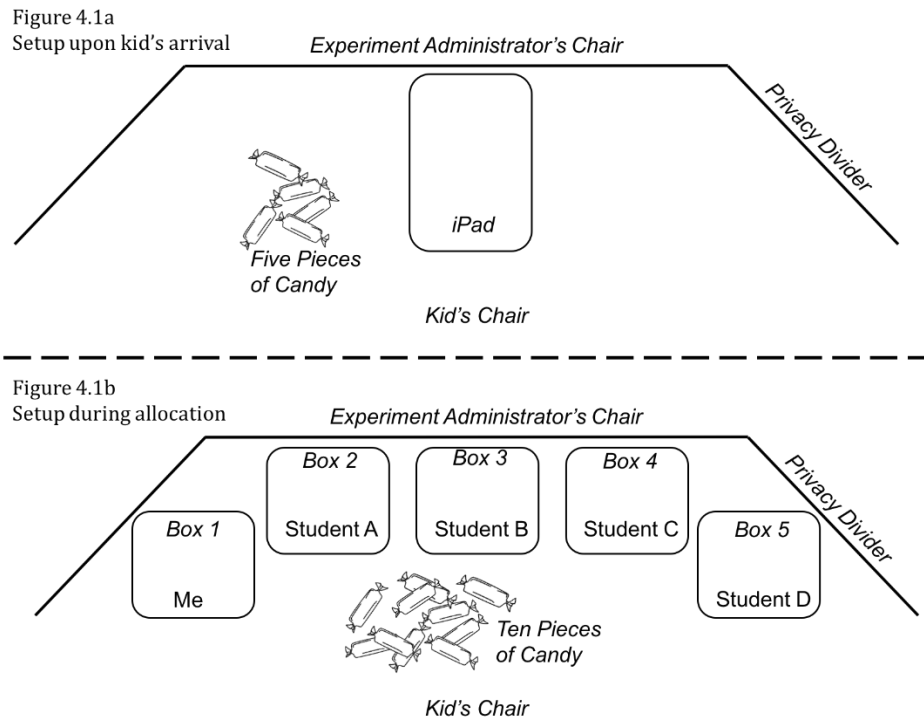


Figure 2 Dictator Game table layout

Dictator Game Procedure

When participants arrived, they were asked to select their favorite candy out of the five types on the table. Then were told they had earned five pieces of their chosen candy for agreeing to play with the administrator, and five pieces were placed on the table next to the participant. Participants were then told they had an opportunity to earn more candy based on how they played a short game on an iPad. Participants were randomly assigned one of two iPad games. One game was a matching game where second-grade participants saw 12 tiles and fourth-grade participants saw 16 tiles and had to make as many matches within one minutes as they could. Participants made matches by touching any two tiles, if the image on the two flipped tiles was the same, the participant made a match. The second of two games had overlapping tiles labeled

with numbers from 1 to 100. Participants had to touch as many tiles as they could, in order from 1 to 100, in one minute. If participants accidentally touched the wrong number, the game ended.

After playing one of the two games, participants were told they had earned five additional pieces of the candy they had selected as their favorite. Regardless of performance, all participants earned five additional pieces of candy for a total of 10 pieces. The administrator then removed the iPad and placed five black boxes with hinged lids in front of the participant. One of the five boxes was labeled “Me”. In Part A, the remaining four boxes were labeled with four same-grade peers’ names: one best friend, one acquaintance, one central peer, and one isolated peer. All names represented same-grade peers selected based on outcomes of the social network analysis iPad survey conducted prior to the dictator game. The social network analysis rationale and procedures are described in the following section. In Part B, the remaining four boxes were labeled Student 1, Student 2, Student 3, and Student 4.

All participants completed both Parts A and B in random order. If a participant was completing Part A he/she was told the candy earned was his/her candy, if he/she wanted to take the candy home with them he/she should put it in the box labeled “Me”. However, if he/she wanted he/she could choose to share the candy with the peers whose names were on the boxes in front of him/her. The participant was told to put any candy he/she wanted to share in the box with the name of the student with whom they wanted to share, and at the end of the week the administrator would give the candy to that student. Participants were again reminded that the candy was theirs, and that they could decide what they wanted to do. If a participant was completing part B, he/she was told that the candy he/she earned was his/her candy, and any candy

they wanted to take home he/she should put in the box labeled “Me”. If he/she wanted, he/she could choose to share the candy with anonymous peers in his/her grade. Any candy he/she wanted to share should be put in the boxes labeled “Student 1 – 4”, and at the end of the week the administrator would draw names from a hat and if there was candy in the box, that student would get the candy. Regardless of condition, participants were told their decisions were anonymous. Specifically, they were told that the student who received the candy would not know who had shared the candy with them, and if the participant chose not to share the candy, the student would not know that the participant had chosen not to share. If participants asked questions, the directions were repeated.

The administrator told participants they would make their decisions in private, and once they had made their decisions they should close all of the box lids and tell the administrator. The administrator turned her back during the experiment and worked on other tasks while participants made their decisions. After participants finished making decisions, the administrator took the four boxes labeled with student names or student 1 – 4, and placed them on the other side of the divider. The administrator moved the box labeled “Me” off to the side and told the participant that he/she was going to play a second game and for agreeing to play the second game, the participant had earned another five pieces of his/her favorite candy. The participant then played the second of the two iPad games and at the end of one minute was again told that he/she had earned five more pieces of candy. Then the participant completed the second part (either A or B depending on which part was randomly selected first).

After the participant had completed Parts A and B, he/she was given an opaque bag with his/her name on it and was instructed to take the candy from the two boxes

labeled “Me” and place the candy in the bag. The bag was then sealed keeping the quantity of candy in the bag private from both the administrator and the other children in the participant’s class (Kogut, 2012). After the candy was sealed in the bag, each participant was asked the following questions about his/her decision making process and satisfaction with his/her choices:

1. How did you decide what you wanted to do with your candy when you didn’t know who was going to get the candy?
2. How satisfied are you with what you decided to do?
3. How did you decide what you wanted to do when you knew who was going to get the candy?
4. How satisfied are you with what you decided to do?
5. If other kids were to play the game and decide if they wanted to share, what do you think they should do?

For questions two and four, participants were shown a happy-face Likert-scale with five faces on it. The administrator pointed to the faces and described each face as she pointed: really happy, a little happy, neither happy nor upset, a little upset, and really upset. The participant indicated his or her face by pointing to the face corresponding to his/her satisfaction. After they had answered all questions, participants took their bags of candy and returned to their classrooms. All sessions were videotaped.

Social Network Analysis Rationale

Social network analysis (SNA) examines the relationships among members of a network, as well as the characteristics, or attributes of those members (Borgatti, Everett & Johnson, 2013; pgs. 2 – 3). Actors are *nodes* and the relationships between actors are *ties*. SNA can be used to study phenomena at the dyad, node, and network

level. At the dyad level, researchers study relations between two nodes. At the node level, researchers study characteristics of individuals in the network. At the network level, researchers study the structure of the overall network. SNA can be used for both basic and applied research questions. In applied research, outcomes from SNA are used to make decisions. In a school setting, this could be identifying isolated children and targeting them for social interventions. In basic research, SNA is used to generate variables for use in further analysis. These variables can be either independent or dependent. In a school setting, a dependent variable might be isolation and researchers use psychological or academic characteristics to predict isolation from peers. Isolation could also be used as an independent variable to predict academic performance.

SNA has been used in developmental psychology to examine the development of pro-social behaviors including sharing and equality preferences in children (Paulus, 2016). It has also been used to study the effect of a child's location within the social network on both psychological and academic outcomes (Cairns, Perrin, & Cairns, 1985).

Specifically, I used a child's position within the network to predict the likelihood they would receive resources from the dictator. The network is constructed based on affective and perceptual social relations ties. This means the ties are based on feelings and perceptions, not necessarily on formal or structural ties. I defined the sociological group as all same-grade peers within CEMS. Defining the sociological group allows me to draw conclusions about the shape and structure of the social network. This design relies on self-reporting of participants about the members of their own social networks, and is therefore subject to errors of omission. Errors of omission can occur when participants do not identify all members of their social network. To

reduce the likelihood of this type of error, I provided participants with complete lists of all same-grade peers by class.

In addition to collecting data about individual networks for each participant, I also collected cognitive social structure data. This type of data asks participants to not only describe the relationships they have with others, but also all of the relationships that they perceive exist within the sociological group (in this case, all same-grade peers). Once aggregated, the data can be used to identify the entire structure of the social network. I used this cognitive social structure data to identify popular and isolated same-grade peers.

Social Network Analysis Setting

Participants completed the SNA in a classroom at the school site in groups of 4-6 participants. While participants completed the experiment in groups, each participant sat at an individual desk with a divider preventing him/her from seeing the iPads of any other participants. Additionally, to insure private instead of group decisions, participants were instructed to do all thinking about their answers in their heads, and not to discuss their thinking or answers with any other participants. During the experiment participants were also given a snack and a juice box. The experiment took approximately 20 minutes per group.

Social Network Analysis Procedure

When participants arrived, they were told they were going to use the iPad to identify the people they know and hang out with in their grade at their school. The first screen asked participants to select their grade, teacher, and name by touching the appropriate button on the screen. Administrators walked around the room verifying

that each participant had selected the correct name. After identifying himself or herself, each participant saw an alphabetical array of peers in one of the five teacher's classes at the school. Participants were instructed to touch the names of all of the peers they knew in that class. If the class was the participant's own class, the participant's name was omitted from the array. A sample screen is included as Figure 3. If a participant selected a name, the button surrounding the name turned green (otherwise the button was blue). Once a participant had selected all of the peers he/she knew in the first class, he/she selected the "These are all of the peers I know in this class button" and completed the same process for the remaining four classes. If a participant did not know any peers in a particular class he/she could select the button, "I do not know any peers in this class" and this would automatically move them to the next teacher's class. Because the word "know" can be interpreted differently by different participants, all participants were directed to select the name of a student, not just if they had heard this person's name before, but if they knew something about that peer. Administrators emphasized that they did not have to be "friends" in order to "know" someone, but that they could select peers who they knew but didn't play/hang out with. Once participants selected all of the peers they knew, this list of known peers was used to generate all arrays in the remaining parts of the SNA experiment.

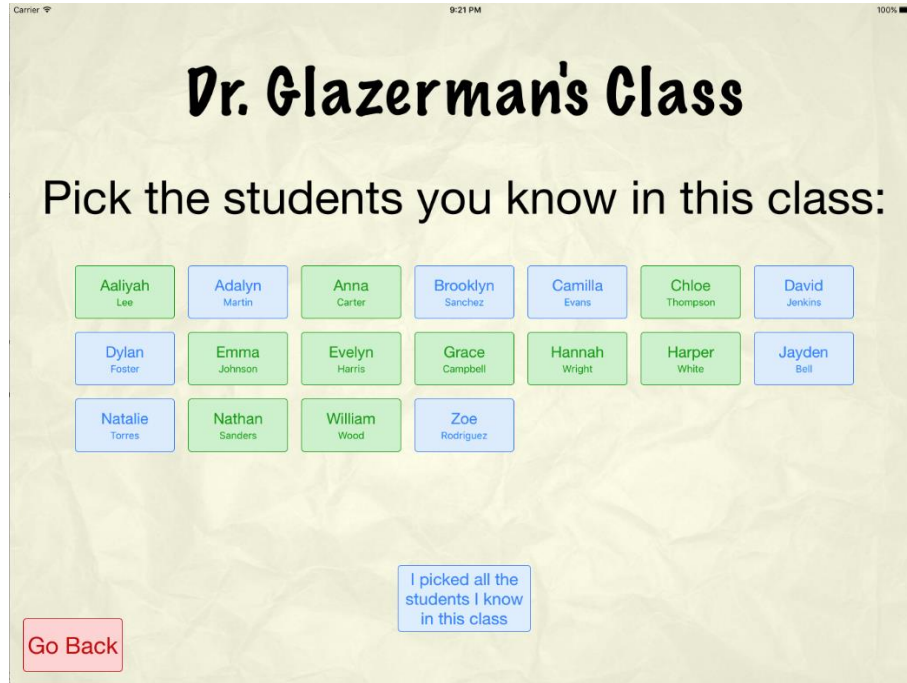


Figure 3 SNA Screenshot, selecting students who you know

In the second part, participants were asked to select the names of peers with whom they played/hung out with a lot. For second-grade participants the term “played with” was used as this is how peers in second grade were observed to discuss social relationships during Phase 1. For fourth-grade participants, the term “hung out with” was used as this is how peers in the fourth grade were observed to discuss social relationships during Phase 1. In the third part, participants were asked to select the names of student with whom they played/hung out with a little. In the fourth part, participants were asked to identify the peers with whom they were “best friends”. Participants were told they could select zero, one, or many best friends. In the fifth part, participants were asked to identify the peers with whom they played/hung out with outside of school activities.

In the sixth and final part, participants were shown an alphabetical array of all peers who they identified as “known”. This array differed from previous arrays because it showed all peers on one screen instead of showing each class of peers separately. For this part, participants were directed to think about peers who played/hung out together in groups. Participants touched all the names of peers who played/hung out in a group together then selected the button at the bottom of the screen to indicate that these peers were a group. Participants could select as many groups as they wanted. Participants could place peers in multiple groups, were not required to place all peers in groups, and could place themselves in groups. A sample screen is included in Figure 4.

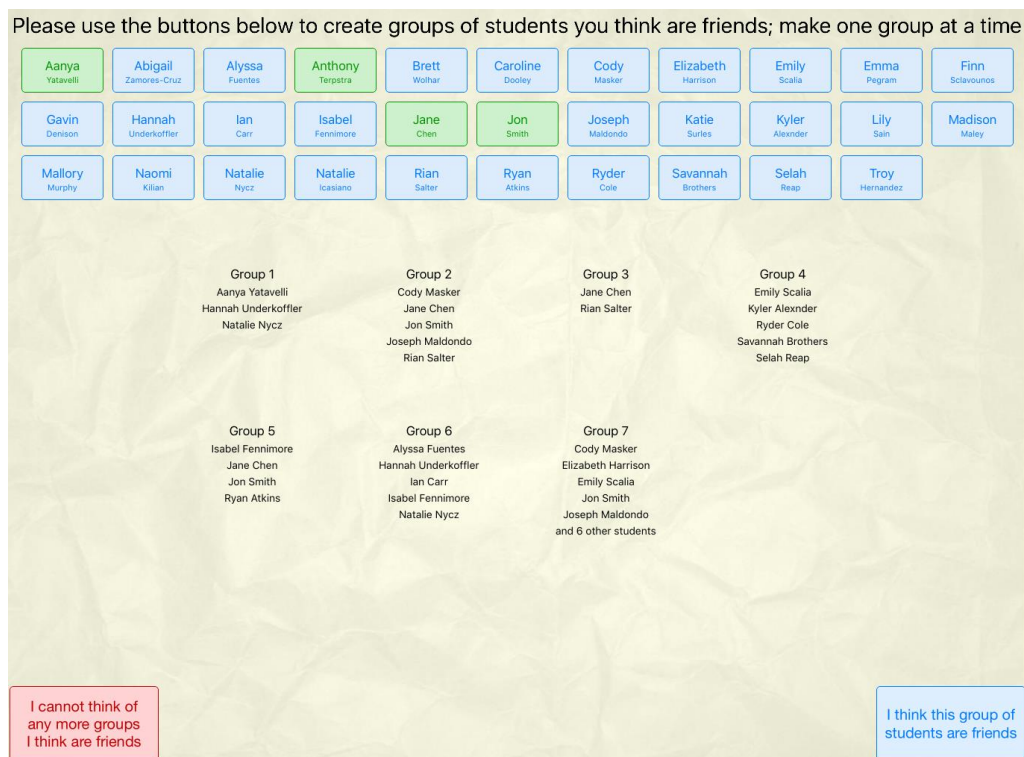


Figure 4 SNA Screenshot, selecting groups of students who are friends

Once a participant had finished making groups and selected the button “these are all of the groups I know”, the screen displayed only the names of peers who were not identified as members of any group. Participants were asked to identify the peers who did not play/hang out with other peers at school. If a participant was unsure whether these peers did not belong to any groups, they could select the button that they did not have to select any names.

Generating Variables for the Dictator Game

For Part A of the multi-recipient dictator game, I purposefully selected four recipients for each participant based on analysis of the SNA data. Recipients came from four categories, *Best Friend*, *Acquaintance*, *Central*, and *Isolate*. Below I describe how each variable was generated from the SNA.

Best Friend is defined as another child in the same grade who the participant identified as a “best friend”, someone with whom they play “a lot” at school, and someone with whom they also play with “outside of school”. If a participant identified multiple children who fit into the “Best Friend” criteria, I selected one child at random. For participants who did not have any peers who fit all three criteria, I first dropped the “outside of school” criterion, then the play with “a lot” criterion. If one or more children met the criteria after the first criterion was dropped, I randomly selected a child. If not, then I dropped the second criterion and randomly selected a child. Six participants did not have a peer that met all three criteria. One participant did not have a child that met two of the three criteria.

Acquaintance is defined as another child in the same grade who the participant identifies as someone they “know” but the participant does not identify them as

someone with whom they play at school or out of school, or whom they identify as a “best friend”.

Central is defined as the five children in each grade with the strongest connections to other children within the grade as determined by *eigenvector centrality*. Eigenvector centrality takes into account not only the ego’s centrality, but also the centrality of the ego’s alters weighted by the strength of the ties between ego and alters. (strength of tie is determined by the total number of times an ego was identified as having a tie to an alter by all participants) (Borgatti, Everett, Johnson, 2013). For each participant, I randomly selected one of the five Central children.

Isolate is defined as one of the children in each grade not named by any of the participants as someone who they knew. Only known children were shown in subsequent survey questions, therefore if a child is not selected as “known” they are also excluded from being selected in all other categories (best friend, play with a lot, play with a little, play with outside of school). In second grade, four children out of 104 total children in the grade were not identified as “known” by any participants. In fourth grade, six children out of 127 were not identified as “known” by any participants. It is important to note that children designated as Isolates in this context are not necessarily isolated children within the grade or within the school. It may be the case that the children who know and play with these “isolates” were not participants in the study, and that if other children had participated then these “isolates” might have been “known” or even “played with a lot”.

Data Analysis Strategy

The dictator game experiment resulted in quantitative and qualitative datasets that presented multiple ways of investigating how kids make resource allocation

decisions. The quantitative dataset, drawn from kids' behaviors during the game, provided information about kids' choices and preferences. The qualitative dataset, drawn from post-game interviews, provided information about kids' rationale and satisfaction with their choices. I analyzed quantitative and qualitative data to answer the following questions. Questions one through four are answered using quantitative data; questions five and six are answered using qualitative data.

1. What factors affect the likelihood that a kid shares at least one candy in a given round?
2. Does knowing the names of the recipients change the number of candies kids share?
3. Does recipient anonymity affect whether kids share equally among all four recipients?
4. Does the recipient's role in the child's social network affect how many candies they receive?
5. Is satisfaction with their choices different depending on whether kids know with whom they shared candy?
6. How do kids describe the criteria they used to make allocation decisions?

The data analysis strategy for addressing each question is described below.

Likelihood of Sharing at Least One Candy

First, I used a repeated measures logistic model to determine what factors predicted whether a kid would share at least one candy during a round, specifically examining if a kid is more likely to give one candy when allocating to named versus anonymous recipients. Since each kid completed two rounds, one named and one anonymous, I used a repeated measures model to account for multiple measures from each kid. Quasi Likelihood under Independence Model Criterion (QIC) is used in

repeated measures binary logistic generalized linear models (GLM) to determine which model best fits the data. Additionally, there are three measures of the predictive accuracy of the model: percent of cases correctly predicted, sensitivity, and specificity. Percent of cases correctly predicted is equal to the number of true positives plus the number of true negatives divided by the total number of cases. This statistic is a general measure of accuracy. Sensitivity and specificity are more explicit measures of accuracy that identify how well the model predicts positive outcomes (sensitivity), and how well it predicts negative outcomes (specificity). All three measures have a range of 0 to 1 with higher numbers indicating a more accurate predictive model.

I used a repeated measures logistic model to determine what factors predicted whether a kid would allocate (share) at least one resource (piece of candy) during a round. The outcome variable, *allocate1*, is a dichotomous variable where a value of one indicates a kid shared at least one piece of candy within a round and a value of zero indicates a kid did not share any pieces of candy within a round. Each kid completed two rounds of sharing: one round they saw the names of recipients (treatment condition) and the other round recipients were anonymous (control condition). In this model, positive outcomes were defined as allocating at least one piece of candy in a round, and negative outcomes were defined as not sharing any pieces of candy in a round.

The following variables were included as independent variables: *kid gender*, *treatment condition*, and *age in years*. *Grade* was dropped from consideration in the analysis as it violated expected frequency (Garson, 2011; Hosmer & Lemeshow, 2000). All fourth graders shared at least one candy in the named round, thereby resulting in cell size of zero for sharing no candies in the named round (Meyers,

Gamst, & Guarina, 2006; Tabachnick & Fidell, 2007). Descriptive statistics for independent variables are included in Table 5. Table 6 presents differences by grade level for all variables.

Recipient Anonymity and the Number of Candies Shared

After examining whether the likelihood of sharing at least one resource increased when kids saw recipient names, I investigated whether the total number of candies allocated in each round was different. The data distribution for total number of candies allocated per round was tri-modal, with peaks at 0, 4, and 8, and therefore did not meet requirements for paired t-tests. Since the data were nonparametric, I used the Wilcoxon signed-rank test to compare the number of candies allocated between the named and anonymous recipient rounds. The Wilcoxon signed-rank test compares the number of candies allocated in the two rounds identifying whether the candies allocated were equal in both rounds, greater in the named round, or less in the named round for each kid. Z-scores were calculated to determine if there was a significant difference between the positive and negative differences. Effect size for the difference is also reported.

Recipient Anonymity and Equal Distribution

Next, I tested whether recipient anonymity affected kid's decisions to allocate an equal number of candies to recipients within a round. Given that equal distribution is a dichotomous variable (kids either distributed equally or did not), I used the McNemar test to compare the proportion of kids who allocated candies equally between the two rounds. This test is the equivalent of the paired samples t-test for dichotomous variables. *P*-values are calculated to determine if there is a significant

difference in the proportion of kids who distributed candies equally between rounds (named and anonymous).

Recipient Role and Number of Candies Received

I further investigated the distribution of candies among recipients by examining whether kids systematically allocated more or fewer candies to recipients based on their role in the kid's social network. Since each kid could choose to allocate his/her candy among four recipients within a round, each kid made four choices in each round. I used Friedman's ANOVA because, like a repeated measures ANOVA, it allows for multiple measures from each kid. Unlike a repeated measures ANOVA, Friedman's ANOVA is appropriate for nonparametric data. I ran two Friedman's ANOVA tests: one for the named round, and one for the anonymous round. An F test (chi squared distribution) is used to test for overall statistical difference between the amounts allocated to each of the four recipients. If the overall test of differences is significant post hoc comparisons between candies shared are tested using the Wilcoxon signed-rank test. Z-scores are calculated to determine if there is a significant difference between choices. Effect size for the difference is also reported.

After investigating allocation differences within rounds, I further explored the data to identify covariates that helped explain how many candies participants allocated within a round. As each kid made four decisions in each round, the number of candies allocated to one recipient is not independent from the number of candies allocated to a second kid in that same round. Therefore, I used a multilevel model with an unstructured covariance matrix to account for the dependence of the four allocation decisions made by each kid within a round. I used an unstructured covariance matrix to allow for all variances and covariances to be independently estimated without

forcing a specific structure on the matrix. I first ran an empty model to determine the interclass correlation coefficient (ICC). The ICC identifies the proportion of variation in the outcome (number of candies allocated) that occurs at the second level of the model. I then added variables of interest (recipient types), and finally control variables, evaluating model fit after each addition. Model fit is determined by the following goodness-of-fit measures: Akaike's information criterion (AIC), Hurvich and Tsai's criterion (AICC), Bozdogan's criterion (CAIC), and Schwarz's Bayesian criterion (BIC). Each of the above criterion are used to compare model fit, but are not absolute measures of model fit. As such, smaller values represent better fit in all cases.

Recipient Anonymity and Participant Satisfaction

Next, I examined kids' level of satisfaction, rated on a 5-point Likert scale, with the decisions they made in each round. I used a Wilcoxon signed-rank test to determine if there was a difference between satisfaction ratings in the named and anonymous rounds. Again, z-scores are calculated to determine if there is a significant difference in satisfaction between rounds. Effect size for the difference is also reported.

Rationale and Explanation for Choices

Finally, I investigated how kids explained the choices they made in both the named and anonymous rounds. In the post-dictator game interview, kids were asked how they decided what to do with their candy when they saw the names of the kids they could share with (named round), and then how they decided what to do with their candy when they did not see the names of the kids (anonymous round). I first used open coding to look for themes in kids' responses. From the emergent themes, I

identified the following codes to describe how kids explained their decision-making processes:

Behavioral Norms: kid referenced behavioral norms regarding either how kids should share, or why kids should share

Recipient-Oriented: kid referenced potential recipients including preferences, characteristics, or relationship status with self

Self-Oriented: kid referenced his/her own preferences

Random: kid referenced selecting recipients randomly

Don't Know: kid indicated he/she was not sure what his/her criteria was

Table 7 includes codes, descriptions, and sample responses. Kids' responses could be assigned multiple codes. For example, one kid mentioned he wanted to the same number of candies in each of the boxes for anonymous kids. He also said he didn't know who the recipients were. His response was coded as *recipient oriented* because he referenced his relationship with the recipients and *behavioral norms* because he mentioned a desire to divide the candy equally among recipients. Dummy variables were created to identify whether a code was present (value of 1) or missing (value of 0) for each kid's response. Frequencies for these qualitative variables are included in in Table 8. I used the McNemar test to determine whether the proportion of responses for each variable was different between the two rounds. *P*-values are calculated to determine if there is a significant difference in the proportion of responses between rounds (named and anonymous).

Table 7 Qualitative variable descriptions from dictator game interviews

Code	Description	Example Excerpt
Behavioral Norms	kid referenced how and/or why kids should share	“I gave everybody a piece because I wanted to make it fair.”
Recipient-Oriented	kid referenced potential recipients including recipient preferences, characteristics, and/or relationship status with self	“I just knew the people and I knew what they were like, so I put the Twix in the boxes that I knew they were nice people.”
Self-Oriented	kid referenced his/her own preferences	“I took flavors that I like the best because those flavors don't really come a lot in packages.”
Random	kid referenced selecting recipients randomly	“I decided to put them in just a random one, so people could just have some candy.”
I don't know	kid indicated he/she was not sure what his/her criteria was	“I do not really know why.”

Table 8 Frequencies for Dictator Game Choice Rationales by Round

	Frequency Named Round	Frequency Anonymous Round
Behavioral Norms	23%	48%
Recipient-Oriented	89%	29%
Self-Oriented	8%	6%
Random	3%	28%
Don't Know	1%	6%

Note $n=80$

Results

Likelihood of Sharing at Least One Candy

Regression diagnostics revealed no outliers, influential cases, or multicollinearity, however, cross-tabulations showed small cell size for the variable

grade. Data was complete for 84 of 85 participants. One participant did not provide birthdate so I could not calculate age in years. Listwise deletion was used and one kid was dropped. I specified an unstructured working correlation matrix. The Quasi Likelihood under Independence Model Criterion was lower for this model (QIC = 127.264) than for a model estimated assuming an independent working correlation matrix (QIC = 127.476). The working correlation matrix revealed a moderate correlation of allocation decisions between rounds ($r=.353$).

The model correctly predicted 81.47% of cases. Specificity was very low, 7.69%, however, sensitivity was high 95.14%. Two variables significantly predicted a kid's decision to share at least one candy, *treatment condition* and *age in years*.

Treatment condition significantly predicts whether a kid will share at least one candy ($B = 1.30, p < .001$). In the named recipient condition, participants are 2.67 times more likely to share at least one candy than in the anonymous recipient condition. Age in years also significantly predicts whether a kid will share at least one candy ($B = .881, p = .001$). For a one-year increase in age, participants are 1.41 times more likely to share at least one candy. Gender was not a significant predictor of a kid's choice to share at least one candy. Table 9 presents all parameter estimates, Wald statistics, odds ratios, and confidence intervals.

Table 9 Repeated Measures Logistic Regression Analysis Summary for Variables Predicting Allocating at Least One Candy

Predictor	B	Wald	p	Odds Ratio	95% CI for Odds Ratio	
					Lower	Upper
Condition	1.30	16.35	< .001	3.67	1.195	6.891
Age in Years	.881	11.40	.001	2.41	1.447	4.022
Gender	.403	.51	.475	1.50	.495	4.520
Intercept	-5.657	5.35	.021	.003	.000	.089

Note: n=168 observations, n=84 participants

Corrected Quasi Likelihood under Independence Model Criterion (QICC) = 126.362

Quasi Likelihood under Independence Model Criterion (QIC) = 127.264

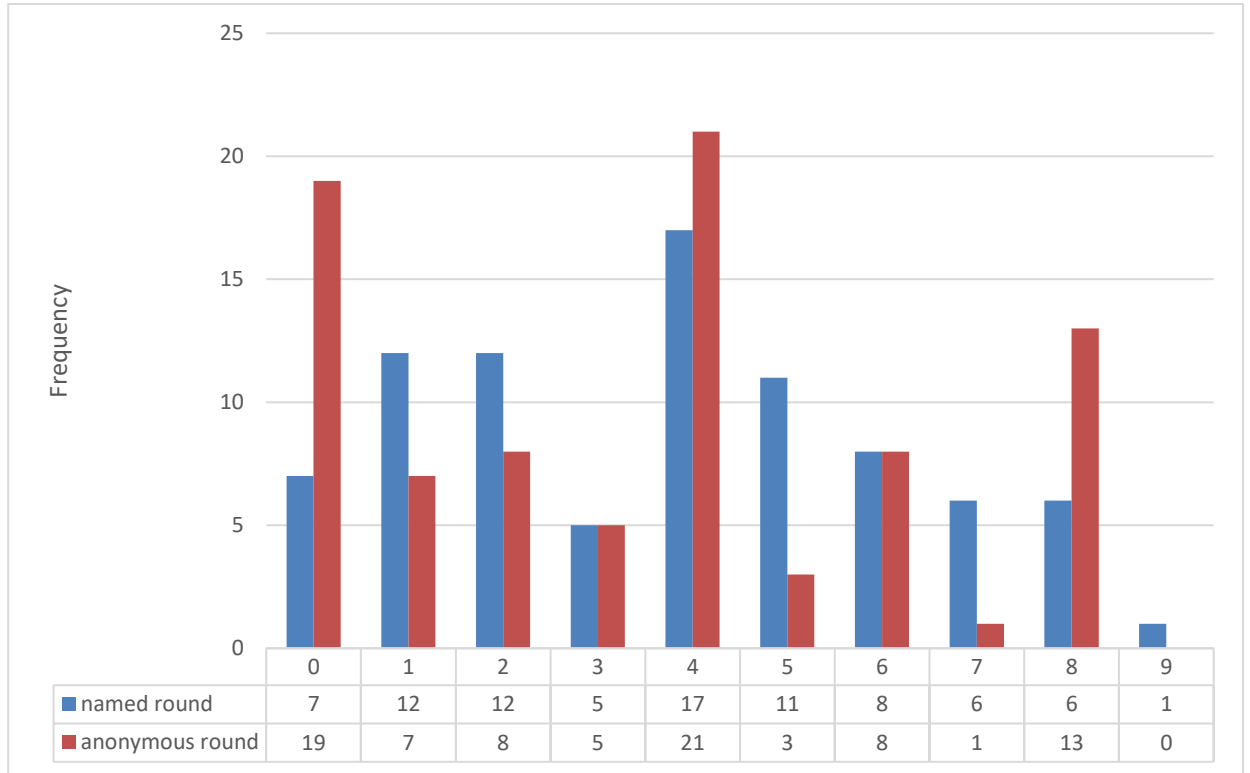
Correlation Matrix = unstructured, Working correlation matrix $r=.353$

Recipient Anonymity and the Number of Candies Shared

I used the Wilcoxon signed-rank test to determine whether the total number of candies shared in a round was different in the named and anonymous rounds. Figure 5 displays the total number of candies shared by round. The mean shared in the named round was 3.78 and the mean shared in the anonymous round was 3.48. There was no significant difference between the number of candies shared in the named and anonymous rounds ($n = 85$, $Z = -1.172$, $p=.241$) with an effect size of $r = -0.090$.

Recipient Anonymity and Equal Distribution

I used the McNemar test to determine whether anonymity of recipients affected whether kids shared candies equally among recipients (i.e. gave each recipient in a round 1 candy or gave each recipient in a round 2 candies). In the named round, 12.94% of kids distributed candy equally among all recipients. In the anonymous round 38.82% of kids distributed candy equally among all recipients. This was a significant difference, with 3 times more kids distributing candy equally among recipients in the anonymous round ($p<.001$) than in the named round.



Note: n=85 participants, n=170 observations

Figure 5 Frequency of total number of candies shared by round

Recipient Role and Number of Candies Received

I used Friedman's ANOVA to investigate whether kids shared candy differently among recipients within a round for both the named and anonymous rounds. For the anonymous round there was no difference in the number of candies each anonymous recipient received ($n=85$, $\chi^2=4.73$, $df=3$, $p=.19$). In the named round, however, there was a difference in the number of candies each named recipient received ($n=85$, $\chi^2=129.88$, $df=3$, $p<.001$). Given the significant overall effect, I conducted post-hoc comparisons for each possible pair of recipients to determine

whether there was a significant difference between pairs. Descriptive statistics for all recipient categories are presented in Table 10.

Table 10 Mean, median, minimum, and maximum values for number candies shared per recipient

	Mean(sd)	Median	Minimum	Maximum
Best Friend	1.93 (1.203)	2	0	5
Central	.86 (.928)	1	0	4
Acquaintance	.58 (.777)	0	0	2
Isolate	.41 (.660)	0	0	2

Note: n=85 participants

Effect sizes for all pairs are presented in Table 11. The difference in the number of candies shared was significant for the following pairs: Best Friend and Central ($n = 85$, $Z = 5.20$, $p < .001$, $r = .40$), Best Friend and Acquaintance ($n = 85$, $Z = 6.80$, $p < .001$, $r = .52$), Best Friend and Isolate ($n = 85$, $Z = 7.96$, $p < .001$, $r = .61$), and Central and Isolate ($n = 85$, $Z = 2.76$, $p = .006$, $r = .21$). The difference was not significant between Acquaintance and Isolate ($n = 85$, $Z = 1.16$, $p = 1.00$, $r = .09$), and between Acquaintance and Central ($n = 85$, $Z = -1.604$, $p < .652$, $r = -.12$). All p-values reflect the Bonferroni correction for multiple tests.

Table 11 Mean, median, minimum, and maximum values for number candies shared per recipient

	Mean(sd)	Median	Minimum	Maximum
Best Friend	1.93 (1.203)	2	0	5
Central	.86 (.928)	1	0	4
Acquaintance	.58 (.777)	0	0	2
Isolate	.41 (.660)	0	0	2

Note: n=85 participants

I further investigated these distributional differences in the number of candies shared with each recipient using a multilevel model to allow for decisions nested within kids. Level 1 is defined as the number of candies shared with a recipient. Level 2 is defined as the kid (participant). The ICC for the empty (or null) model indicated that 7.5% of the variance in number of candies shared with a recipient was attributed to the kid. I next added dummy variables for each recipient: *acquaintance*, *central*, and *isolate*. *Best Friend* was the omitted category. Model fit improved across all criteria, and these variables explained 41.35% of the variance at level 1. For the final model I added gender and grade as kid (participant) level control variables. Model fit improved across all criteria. Table 12 presents model fit for all three models (null model, model with level 1 variables, and model with all variables). These variables explained 8.5% of the variance at level 2. All three recipient dummy variables and grade were significant predictors of the number of candies shared. Central recipients received approximately one fewer candies than best friend recipients ($B=-1.07$, $p<.001$). Acquaintance recipients received approximately one and one third fewer candies than best friend recipients ($B=-1.36$, $p<.001$). Isolated recipients received approximately one and one half fewer candies than the best friend recipient ($B=-1.52$, $p<.001$). Additionally, grade was a significant level 2 predictor. Kids in fourth grade shared more candy per recipient than second graders shared ($B=.29$, $p=.028$). Gender was not a significant level 2 predictor. Table 13 presents all parameter estimates, standard errors, and confidence intervals.

Recipient Anonymity and Participant Satisfaction

I used the Wilcoxon signed-rank test to investigate whether self-reported satisfaction levels were higher for the named versus anonymous rounds. Kids rated

their satisfaction from one to five with one being very unhappy and five being very happy. The mean satisfaction in the named round was 4.51. The mean satisfaction in the anonymous round was 4.04. This was a significant difference, with kids reporting higher levels of satisfaction in the named round ($n = 78$, $Z = -3.318$, $p = .001$) with a small to medium effect size ($r = -.266$).

Table 12 Model fit for Multi-level model predicting number of candies shared per recipient in the named round

	Model		
	Null	Level 1 variables: Recipients	Level 2 Variables: Grade, Gender
-2 Restricted Log Likelihood	1017.628	875.783	861.700
Akaike's Information Criterion (AIC)	1023.628	887.783	877.700
Hurvich and Tsai's Criterion (AICC)	1023.699	888.035	878.140
Bozdogan's Criterion (CAIC)	1038.114	916.756	916.237
Schwarz's Bayesian Criterion (BIC)	1035.114	910.756	908.237

Note: all criteria are presented in lower is better form

Multi-level model summary for variables predicting number of candies shared per recipient in the named round

	B (SE)	Df	p	Confidence Interval	
				Lower Bound	Upper Bound
Central	-1.07 (.123)	249	<.001	-1.31	-0.83
Acquaintance	-1.36 (.123)	249	<.001	-1.60	-1.11
Isolate	-1.52 (.123)	249	<.001	-1.77	-1.28
Grade	.29 (.130)	81	.028	0.03	0.55
Gender	-.17 (.130)	81	.185	-0.43	0.08
Intercept	1.87 (.138)	156.23	<.001	1.60	2.14

Note: n=85 participants, n=340 observations

Rationale and Explanation for Choices

I used the McNemar test to determine whether the proportion of kids who gave a specific rationale for their choices differed between the named and anonymous rounds. There were significant differences between rounds for the following rationales: *behavioral norms*, *recipient-oriented*, and *random*. First, in the anonymous round, 48% of kids mentioned behavioral norms in their rationales, while in the named round only 23% of kids mentioned behavioral norms. This was a significant difference in proportions with 2.11 times more kids using behavior norms in their explanations than in the named round ($p<.001$). Second, in the named round, 89% of kids mentioned recipient characteristics in their rationales, while in the anonymous round only 29% of kids mentioned recipient characteristics. This was a significant difference in proportions with 3.10 times more kids using recipient characteristics in their explanations than in the named round ($p<.001$). Finally, in the anonymous round, 28% of kids mentioned random reasons in their rationales, while in the named round only 3% of kids mentioned random reasons. This was a significant difference in proportions

with 11 times more kids using recipient characteristics in their explanations than in the named round ($p < .001$). There was no significant difference between rounds for the proportion of kids referencing the following rationales: *self-oriented* and *don't know*.

Discussion

Kids were more likely to give at least 1 candy in the named condition than in the anonymous condition. This is consistent with my hypothesis that the role of the recipient matters. When the recipients are anonymous, it is more likely that the kid chooses to not allocate any candies. The qualitative data from the surveys supports this conclusion. When asked how they decided what to do with their candy, kids often replied that their decisions in the anonymous round were based on not knowing who would receive the candy. Specifically, they expressed concerns that the recipient could be someone who they didn't know, or someone who was "mean" or "not nice" to them. Not knowing the identity of the recipients affected allocation decisions by increasing the likelihood that no candies would be allocated. Additionally, older participants were more likely to give at least one candy than younger participants. This finding is consistent with prior research which shows that as children get older they are more likely to engage in sharing behaviors (Fehr, Glätzle-Rützler & Sutter, 2013; Fehr & Rockenbach, 2008).

Although kids were more likely to give at least one candy in the named round, the total number of candies allocated among the four recipients does not differ in the named and anonymous conditions. This suggests that once a kid decides to share, the number of candies they share does not depend on knowing the identity of the recipients. However, the way candies are distributed does differ between the two conditions.

When recipients are anonymous, participants more often distributed candies equally than when recipients' identities were known. This suggests that while the identity of recipients doesn't determine how many candies a kid will allocate, it does determine how those candies will be allocated among recipients. Given no information about identity, kids more often choose to allocate equally among all four recipients. This is consistent with prior literature (Blake & McAuliff, 2001; Shaw & Olson 2012). This finding is also consistent with qualitative data. In explanations of their choices, kids more often referenced behavioral norms like being "fair" or "sharing equally" in the anonymous round than in the named round. Without any differentiating information about recipients, kids report defaulting to behavioral norms about sharing when making their decisions.

However, when given information about the identity of recipients, kids are selective in the number of candies each recipient receives. These findings are supported by qualitative data. In explaining their allocation choices in the named round, kids more often referred to recipient characteristics than they did when explaining choice in the anonymous round. This confirms that when kids see the names, they are using this information to make decisions about who gets candy and how much they get. For example, kids report they thought about "best friends", as well as "who was funny, but mean" when deciding how many candies to allocate to each recipient.

In the named condition, participants allocated more candies to the best friend recipient than to any other type of recipient (known, central, isolated). This is consistent with my observations in Phase 1 that kids show a preference for allocating candies to close friends. In this case, friends with whom they play a lot in school and

out of school. Participants also allocated more candies to the central recipient than the isolated recipient. This is also consistent with my hypothesis that popular kids receive candies over isolated kids. However, there was no difference in the allocation between central and acquaintance or between acquaintance and isolated. This could be due to kids' indifference between these groups, or due to how recipients in each category were determined during the SNA.

Further investigating the allocation of candies in the named condition indicates that older children give more candies to recipients (controlling for recipient type), but that gender is not a significant predictor of allocating candies. Again, increased sharing as age increases is consistent with the literature (Fehr, Glätzle-Rützler & Sutter, 2013; Fehr & Rockenbach, 2008). However, the insignificance of gender in predicting sharing is not consistent with the literature. There is a general consensus that girls share more than boys, and that boys have stronger in-group preferences than do girls. There is no evidence in this study of differences between boys and girls in sharing behaviors in either the anonymous or named conditions.

Finally, qualitative analysis shows kids had higher levels of satisfaction when making allocation decisions among named recipients than among unnamed recipients. This is consistent with my hypothesis that kids make allocation decisions based on relationships with the potential recipients. When given information about recipients that allows kids to evaluate their relationships with the recipient, kids can make better decisions, and thus have higher levels of satisfaction with their choices. When their relationship status with potential recipients is ambiguous, kids are less satisfied with their decisions as they are not able to apply the usual "rules" for resource allocation that are guided by these relationships. For example, kids reported in the anonymous

condition that they did not know if the kids were “nice” or if they “had been mean to me”.

Conclusion

In Phase 1 of this study, I observed kids making allocation decisions that seemed to be heavily guided by their relationships with potential recipients. Kids seemed more likely to allocate resources to recipients with whom they were good friends, and with recipients who were popular. I designed this variation of a multi-recipient dictator game to test and refine my observation that kids resource allocation decisions are guided by relationships. By using SNA, I was able to identify potential recipients who were best friends, acquaintances, popular kids, and isolated kids, and subsequently use these recipients in the dictator game. My findings demonstrate that, compared to allocation decisions made among anonymous recipients, kids are less likely to distribute resources equally when they see the names of recipients. Specifically, they allocate more resources to best friends and popular kids. This quantitative finding is consistent with my hypothesis from Phase 1: kids do make allocation decisions based on relationships.

The qualitative data from post-game interviews provides further evidence in support of this finding. Kids report using different criteria to make decisions depending on whether or not they know the identity of the recipient. When kids do not know identities, they revert to behavioral norms and random selection, however, when recipient identities are known, kids report using recipient characteristics, including relationship status, in deciding how many resources they allocate and to whom. Additionally, kids are more satisfied when they know the identities of recipients. Through identification of recipients, kids are able to consider their relationships when

allocating resources. Thus, decision rules in the dictator game are consistent with decision rules they use in real life, resulting in higher levels of satisfaction.

This game investigated kids' sharing behaviors, however, sharing is just one of the ways I observed kids allocating resources in Phase 1. Kids also engaged in lending and trading behaviors. Future studies should examine the extent to which relationships also guide the rules kids apply to these two forms of resource allocation. Such studies would develop a more robust understanding about the rules guiding kids' resource allocation decisions, and thus their naïve economic theories.

Chapter 5

SPENDING MY PARENTS MONEY, SAVING MY MONEY

Introduction

This study is motivated by my observations of kids' purchasing behaviors during Phase 1. While I initially thought kids' economic problems would not involve money, the kids I observed not only had access to money in school, but also had opportunities to spend money without direct involvement of adults. Therefore, these behaviors fit within the scope of my study of the economic world of kids: to investigate what economic problems were important to kids and how they solved those problems.

In this study, each participant completed two activities. The first activity was a two-part survey about their planned and actual purchases at the Spring Book Fair. The second activity was participating in a field experiment where kids had an opportunity to make purchases at a mock "store". Each participant was given five dollars to spend on the items at the mock store. Kids were divided into treatment and control conditions. In the treatment condition kids were told they could keep any money they did not spend. In the control condition kids were told they had to give any money they did not spend back. I use the results of these two activities to draw conclusions about kids' semi-autonomous purchasing behaviors.

This chapter begins with a rationale for the survey and field experiment design, then describes the methods for both activities including participants, settings, and procedures. Next I describe the data analysis strategy and results followed by discussion and conclusions.

Rationale

This survey and field experiment were motivated by my observations of kids' access to currency and the opportunities they had to make semi-autonomous spending decisions. Prior to observing at the elementary school, I hypothesized that the economic problems important to kids would not involve money. I believed resource allocation problems would revolve around resources that were native to kids, for example toys, food, and school related possessions. I underestimated the access to currency that the kids at CEMS would have, and the extent to which they would be able to make semi-autonomous decisions about the uses of currency. For example:

- The school store is open two mornings a week from the time kids enter the school building until a few minutes before the official start of the day.
- At lunch, kids can make purchases either with money that their parents have put on their lunch account, or they can bring currency.
- Kids bring money to spend on special school activities like the school's book fairs.

While adults can restrict the ways in which kids spend money, kids still have some autonomy since decisions are made outside of the direct control of their parents and without the full knowledge of other adults at school. Parents may have given money to the kids for a specific use. However, once at school, kids have the ability to make choices about what to do with that money.

Since kids have access to currency, and since they are able to make semi-autonomous choices about resource allocation problems involving currency, I designed a two-part study to further investigate how children make and evaluate choices involving currency. I wanted to capture data about spending in a natural setting, and also in a controlled field experiment. For the natural setting, I designed a

two-phase survey, with the first phase administered immediately prior to and the second phase administered immediately following kids' attendance at the Spring book fair. For the field experiment, I set up a mock "store" stocked with items similar to those sold at the school store and at the book fair.

During my Phase 1 Observations at the fall book fair, I identified a phenomenon I wanted to investigate further: kids had separate accounting for currency depending on the source of the funds; they differentiated between their own money and their parents' money. For example, one kid commented to her friend that she was going to spend all of her mom's money and save all of her own money; her friend agreed that this was the right thing to do. This observation provides evidence that kids are engaged in mental accounting. Broadly, mental accounting is a description of the process by which individuals and households keep track of the sources and uses of funds under their control (Thaler, 1999). Mental accounting includes three components. The first component focuses on satisfaction with results of choices. The second component focuses on the sources and uses of funds. The third component focuses on choice bracketing and how often accounts are evaluated. My observations directly relate to the second component as kids seem sensitive to the sources of funds as determinants of the uses. The kid mentioned above has divided her money into two "source" accounts: money from mom, and money from self. The money from these two sources has separate uses: money from mom should be spent at the book fair, and money from self should be saved. For this child, money from these two mental accounts was not fungible, or interchangeable.

Mental accounting has been studied extensively in adults, but the research with children is very limited. To date, three studies have specifically examined mental

accounting in children. Read and Lowenstein (1995) examined choice bracketing, focusing on the third component of mental accounting. They conducted an observational study during trick-or-treating where children in one condition selected two candy bars from one house, and in the other condition selected one candy bar from two sequential houses. Children in the first condition all chose two different candy bars, while only 48% of children in the second condition chose different candy bars (the remaining 52% chose two of the same candy bar). The authors conclude that there is evidence of diversification bias in children consistent with findings in studies with adults. Diversification bias predicts individuals will choose more variety when they make a series of choices simultaneously, than if they make a series of choices sequentially.

Friedline, Elliot and Nam (2012) were interested in factors that predict mental accounting and savings account ownership in adolescents. This study addresses the second component of mental accounting, uses of funds. The authors included a single question in an extensive survey about saving behaviors to determine whether or not adolescents mentally appropriated a portion of their savings to pay for college. Adolescents who indicated affirmatively were coded as engaging in mental accounting, otherwise they were coded as not engaging in mental accounting. The authors then predicted mental accounting and savings account ownership based on other student and parent level characteristics. They conclude adolescents with parents who attended college and with higher incomes are more likely to mentally allocate a portion of their savings to college. One major limitation of this study with respect to investigating evidence of mental accounting is the narrow definition of mental

accounting. The authors were specifically interested in savings for college, and thus defined mental accounting as such.

Only one study, Webley and Plaisier (1998), has been purposefully designed to investigate children's mental accounting holistically. The authors modeled the study design after designs commonly used with adult participants and the study addresses all three components of mental accounting. Their sample included kids aged 5-12. Kids were interviewed about their sources and uses of money, and asked to respond to seven hypothetical scenarios predicting how they would behave in each circumstance. For example, in one scenario kids in the first condition were told they had purchased a ticket to the circus and kids in the second condition were told their parent had purchased a ticket to the circus for them. Kids in both conditions were told that due to last minute car problems, they would need to take the bus to the circus and the bus would cost a week's worth of allowance/pocket money. Kids were asked if they would pay for the bus fare to attend the circus, or just stay home. Across all seven scenarios, the authors found limited evidence that kids engage in mental accounting. However, as this study applied methods used with adults to a population of kids ranging in age from 5-12, and required hypothetical, or stated, responses instead of revealed responses, this may have affected the results. Kids may not have had the ability to predict how they would behave in the scenarios, or may not have been able to integrate all of the information given within the scenarios into their decision making processes.

Although Webley and Plaisier (1998) did not find evidence of mental accounting in kids, my ethnographic data provides evidence kids are differentiating uses of funds based on their source, the second component of mental accounting. I

designed the book fair survey and store experiment to look for additional evidence that kids' spending decisions differ based on the source of money. While kids' choices to spend their parents' money and save their own money might appear irrational, if kids believe any unspent money must be returned to the parent, then this behavior may be a rational maximization of utility (assuming that returning the money to their parents has no utility to the kid). I included questions in the book fair survey to further investigate kids' beliefs about money from different sources, and included a treatment in the store field experiment to simulate kids' beliefs that parents' money had to be returned if it wasn't spent.

Methods

This mixed methods study incorporated both a two-part survey about kids' planned and actual behaviors during the school book fair, as well as a field experiment where kids made purchases at a mock store with either money they could keep or money they had to return if it was unspent. I will begin with a description of the participants, then describe the setting and procedures for the survey, followed by the setting and procedures for the field experiment.

Book Fair Survey

Participants

As described previously in the Methods chapter, the sample for Phase 1 included one second- and one fourth-grade class at CEMS as primary participants. However, second- and fourth-grade kids from other classes were observed during recess, lunch, and other common times specifically when they interacted with kids from the target classes. For Phase 2, I recruited participants by sending home letters,

consent forms, and surveys to parents of the kids in the targeted second- and fourth-grade classes from Phase 1. Additionally, I contacted the other teachers in both grades and requested permission to recruit from their classes. Two additional teachers in fourth grade and two additional teachers in second grade agreed to allow me to recruit kids from their classes. Each teacher allowed me to speak to the students in her class to explain what kids would do if they participated, as well as to explain the benefits, risks, and compensation for participating. Two fourth-grade kids did not give assent, and zero second-grade kids did not give assent. For all kids who gave verbal assent, I sent home informational letters, consent forms, and a demographic survey to parents/guardians. Parents/guardians had the option to complete the survey online or via paper. A copy of the survey is included in Appendix B. A kid was included in the study if he/she gave assent and his/her parent/guardian gave consent. The sample included n=37 second grade kids (35.6% of all second graders) and n=48 fourth grade kids (37.8% of all fourth graders). The sample included 38 males (44.7%), and the racial/ethnic makeup mirrored that of the school. Complete descriptive statistics for participants in Phase 2 are presented by grade in Table 5. There were no significant differences in demographic characteristics between grades other than age and number of years the kids had attended CEMS. Table 6 presents all differences in means and significance levels.

Due to absences on the day of the book fair, data were not collected from two fourth-grade kids. Additionally, three second-grade parents turned in consent forms after the book fair therefore these three kids were not included in the survey.

Setting

The book fair was held in the library, and each class visited the book fair based on the day they were assigned to go to Library as part of the unified arts schedule (of which Library was one of the five classes on the schedule). The kids completed the pre-book fair portion of the survey in their classrooms immediately prior to attending the book fair. After kids had completed their shopping and/or browsing at the book fair, they completed the post-book fair survey in the library.

Procedure

The pre-book fair survey was divided into two parts. First, the kids were each given a copy of the book fair promotional flyer. This flyer had previously been distributed to all students as part of the standard promotion for the school's book fair. The flyer was a single 11x17 inch sheet of paper folded in half and printed in full color. According to the school librarian, the flyer advertised items the publisher wanted to highlight. These included mostly new books, but also popular series, books related to current movies and television shows, and posters. Each item had a photograph, description, and price. Kids were each given a green pen and instructed to circle their three favorite things on the flyer. Then, kids were given a blue pen and instructed to circle their next three favorite things. Finally, they were given a red pen and told to circle their next three favorite things. After they had circled their favorite 9 items, each kid was given a copy of the pre-book fair survey. The questions are included below:

1. How much money did you bring to spend at the book fair today?
2. Where is the money from?
3. What do you plan to buy today?

4. What will happen to the money you brought if you don't spend it all at the book fair today?
5. Did you buy anything at the book fair before today? (If yes: What did you buy? Where did the money come from?)

To ensure that the questions were understood by all kids regardless of reading level, the researchers read questions aloud and provided time between reading questions for kids to write their answers. Kids were instructed to think about their answers in their heads, and not say them out loud. This was done to minimize the chance that kids' answers would be affected by the answers of other kids in the classroom.

Once kids had completed the survey, the survey and book fair flyer were collected and the kids walked to the book fair. Once at the book fair, the kids completed any shopping and/or browsing they wished to do, and per the instructions of the librarian, sat in a designated area away from other shoppers with their purchases. Kids had the opportunity to read quietly or watch a nature documentary. As kids moved to the designated area, the researcher gave each kid a copy of the post-book fair survey, pen, and clipboard. The questions from the survey are included below:

1. What did you buy at the book fair?
2. Were there any things you wanted that you didn't buy? (if yes, What were they? Why didn't you buy them?)
3. How happy are you with the things you bought at the book fair? (happy face Likert-scale with five possible responses) Why did you circle this face?
4. Do you have any money left over? (if yes, How much money do you have left over? What will you do with the leftover money?)
5. How many times did you go to the cash register to make a purchase?

The researcher offered to sit and read the questions to all kids. Most second-grade kids accepted this offer, and no fourth-grade students accepted this offer. Surveys were collected as kids completed them. All surveys were complete prior to the end of the library period.

Store Field Experiment

Participants

The participants for the store field experiment were the same as the participants in the book fair survey with the addition of the three second grade kids whose parents had not yet given consent at the time of the book fair, and the two absent fourth grade kids.

Setting

The mock-store was set up in a small, unused classroom designed for use with small groups of students. The room also had a small anteroom that separated the classroom from the hallway. The anteroom was set up with four chairs, an iPad on each chair, and a desk with a sample of one of each of the items available for sale inside the classroom. The items on the desk were displayed as reference for kids as they completed the pre-shopping survey. Inside the classroom, two tables were set up in an “L” shape along one wall. The items available for sale were displayed in a manner similar to displays kids saw at the school store and at the book fair. There were 15 items available for sale ranging in price from 50 cents to \$2.50. Items included mini scented highlighters, monster erasers (small and large), a chocolate scented eraser and pencil sharpener set, balloon car racers, scented bookmarks, plush animal clips, foam rocket launchers, foam finger flyers, magnetic plush animals, plush

monsters, play foam, metallic rainbow slime, scented pencils, and spy pens. An image of each item available for sale along with its price is shown in Table 14. Each item was labeled with a tag describing what it was. There was also a second tag that showed the price. Items were purchased in bulk by the researchers, and prices were set such that they represented between 50 and 100% markup over the wholesale price. When kids initially looked at the merchandise available for sale, the prices were hidden so that they would not affect kids' responses on the pre-shopping survey. Across from the merchandise, a small desk was set up where kids could take their items when they were ready to make a purchase. The desk contained one or two containers and a cash box. The number of containers varied based on which condition the kid was assigned, either treatment or control. All kids saw a container labeled, "donate". Kids in the control group saw a second container labeled "give back". The purpose of these containers is described in the Procedures section below.

Table 13 Items available for purchase at the mock store

1	Description	Price	Image	Description	Price
	Small Monster Eraser	\$0.50		Foam Finger Flyers	\$1.25
	Scented Mini Highlighter	\$0.50		Magnetic Push Animals	\$1.50
	Large Monster Eraser	\$0.75		Plush Monsters	\$1.50
	Chocolate Scented Eraser and Sharpener Set	\$0.75		Play Foam	\$1.75
	Balloon Race Cars	\$0.75		Metallic Rainbow Slime	\$2.00
	Scented Bookmarks	\$1.00		Scented Pencils	\$2.25
	Plush Animal Clips	\$1.00		Spy Pens	\$2.50
	Foam Rocket Launchers	\$1.25			

Procedure

Kids came to the mock store in groups of four. When they arrived, an experiment administrator explained the procedures to them in the anteroom. Kids were told they were going to receive some money for agreeing to participate, and that they could choose to spend that money on items for sale in the store. They were told that they would have a chance to look at the items available for sale, and then they would answer some questions on the iPad before making any purchases. Kids were then shown into the classroom and one of the administrators described each item, explaining how it worked or what it could be used for. The kids were allowed to look at and touch the items available for sale. The administrators answered any questions the kids had about the items. At this point the prices were not visible to the kids. If kids asked how much the items cost, or how much money they would receive to spend at the store, they were told that these questions would be answered after they had answered some questions on the iPad.

Once all questions about the items had been answered, kids were taken back to the anteroom. Each kid took a seat at one of the chairs and was told how to access the survey questions on the iPad. The survey displayed images of each of the 15 items available for sale and kids were instructed to drag and drop the images to one of three boxes labeled: “I like this a lot”, “I like this a little”, or “I don’t like this at all”. Each item had to be placed in a category, but there was no minimum or maximum number of items that could be placed in each category. Kids then sorted the items within each category so they were ranked from most liked to least liked. Administrators closely monitored kids during the sorting task, clarifying instructions and demonstrating on an as-needed basis how to drag items to the categories. Once the sorting task was complete, kids were shown images of each item and a slider bar that went from \$0 to

\$10. Kids were asked to move the slider bar to the price they think each item should cost. In order to help kids differentiate from the price they “wish” it would be (i.e. free), they were prompted that they should choose the price they think an item would cost if they saw it at a store. Administrators demonstrated how to move the slider bar to the price the kid chose, and answered questions as necessary. Once the survey was completed and submitted, kids were allowed into the classroom one at a time to make their purchase choices. Kids who were waiting to enter the store were allowed to play games on the iPads.

When kids entered the store they were given five one dollar bills and told they were receiving the money because they agreed to participate in the activity. Kids were randomly assigned to one of two conditions prior to the start of the experiment. After receiving their money, kids who were assigned to the “*other’s-money*” condition were told they could choose to spend the five dollars on items available for sale in the store, give the money back to the administrator, or donate it to their teacher so she could buy supplies for next year’s second/fourth grade students. This condition was designed as a proxy for kids spending other people’s money. Although I could have deceived kids and told them the money was from their parents or another adult, deception is not allowed in experimental economics therefore I needed an alternative mechanism for “other people’s money”. Based on observations in Phase 1, I hypothesized kids who were spending their parent’s money believed they had to return any unspent money. Based on this observation, I used “returning” the unspent money to the researcher as a proxy for “spending other people’s money”. Kids who were assigned to the “*own-money*” condition were told they could choose to spend the five dollars on items available for sale in the store, keep the money, or donate it to their teacher so she

could buy supplies for next year's second/fourth grade students. By allowing kids to keep any unspent money, I reinforced that the money was theirs to do with as they pleased. They could spend it or not spend it, and were allowed to keep it regardless of their choices in the mock store.

Unlike when the kids viewed the items before completing the survey, item descriptions and prices were visible. They were told that once they were ready to make a purchase they could bring the item(s) and their money to the cash register where the administrator would take their money and put any item(s) they purchased in a bag labeled with their name. If kids asked questions, the directions were repeated. The administrator offered to help kids make any computations if asked. For example, some kids asked how much two things would cost, and others asked how much they would have left after purchasing specific item(s). After kids had made their purchases, they were informed they would receive their items at the end of the week after all kids had an opportunity to make purchases. Items were distributed at the end of the study to limit the amount of discussion about items and item cost among kids who had not yet participated. After making their purchases, kids were asked three interview questions about the choices they had made. The questions are listed below:

1. How did you decide what to do with the money you received?
2. How satisfied are you with your choices? (smiley face Likert-scale)
3. (If participant had leftover money) What will you do with the money you have left?

After kids answered the interview questions, they were sent back to class. Kids were videotaped while they were in the mock store and during the interview. They were not recorded in the anteroom while completing the survey on the iPad.

Data Analysis Strategy

The book fair survey and mock store experiment provided two ways of investigating kids' semi-autonomous spending decisions, specifically as these choices relate to the second component of mental accounting, the sources and uses of funds. Book fair survey data provided an opportunity to collect observational data in a natural setting. The mock store experiment provided an opportunity to collect data in a controlled field experiment where I manipulated the source of funds (either *self* as source, or *others* as source). The survey and experiment together provide two complementary datasets to investigate how kids make purchase decisions. I collected quantitative and qualitative data from both the survey and experiment, however for the purposes of this analysis, I will be utilizing quantitative data only from the survey, and a mix of quantitative and qualitative data from the experiment. With respect to the experiment, qualitative data is used to explain quantitative findings. In this analysis, I address the following research questions:

1. What are the sources and uses of money kids bring to the book fair?
2. What factors affect the likelihood a kid will have money left over after the book fair?
3. How are second- and fourth-grade kids' purchasing behaviors at the book fair similar and different?
4. What is the relationship between the source of money and kids' purchasing behaviors at the mock store?
5. How are second and fourth grade kids' purchasing behaviors at the mock store similar and different?

Questions one through four are quantitative research questions, and question five is a mixed methods question incorporating quantitative data about spending

behaviors and qualitative data about kids' explanations for their behaviors. The data analysis strategy for addressing each question is described below.

Sources and Uses of Money at the Book Fair

I began analyzing the pre- and post-book fair data by creating variables based on kids' responses to survey questions. I generated the following variables based on the survey data:

Money brought – Kids self-reported amount of money they brought to spend at the book fair.

Money source – Kids' responses were coded as one of three categories: either money was entirely provided by a parent or other family member, money was entirely provided by the kids, or money was provided by a combination of the kid and another family member.

Leftover Amount – Kids self-reported the amount of money they had left over after making their purchases at the book fair.

Leftover Use – Kids' responses were coded as one of four categories: given back, kept, or other. If a kid reported he/she would give the money back to the person who provided it, his/her response was coded as "give back". If a kid reported he/she would spend the money elsewhere, save it for later, or keep it, his/her response was coded as "kept". If a kid reported some other use of the money, for example they didn't know what they would do with the money, or they would donate it, his/her response was coded as "other".

Number Transactions – Kids self-reported the number of times they made purchases at the cash register.

Purchased First – This dichotomous variable was coded as 1 if the kid purchased an item from the three most desired items selected in the pre-book fair survey, otherwise it was coded as zero.

Purchased Second – This dichotomous variable was coded as 1 if the kid purchased an item from the three second-most desired items selected in the pre-book fair survey, otherwise it was coded as zero.

Purchased Third – This dichotomous variable was coded as 1 if the kid purchased an item from the three third-most desired items selected in the pre-book fair survey, otherwise it was coded as zero.

Satisfaction – Kids self-reported their satisfaction with the purchases they made on a 5-point happy-face Likert scale. The happy face scale was converted to numerical values with 1 being lowest satisfaction and 5 being highest satisfaction.

I computed means, standard deviations, maximums, and minimums for each of the above variables. This allowed me to quantify and further investigate behaviors I observed during Phase 1 at the school's fall book fair.

Likelihood of having Leftover Money from the Book Fair

After computing descriptive statistics for the data collected at the book fair, I used a binary logistic model to determine what factors predicted whether a kid would have money left over after making his/her book fair purchases. Several statistics are used in binary logistic models to determine how well the model fits the data: the -2 Log Likelihood, the Hosmer-Lemeshow goodness of fit test, and the McFadden pseudo R^2 and corresponding Cohen's f^2 statistic. The -2 Log Likelihood, using the chi-square distribution, indicates whether the addition of variables statistically

improves the fit of the model over the fit of the intercept-only model. If the p-value is < 0.05 , then the model with the variables fits significantly better than the model with intercept only. The Hosmer-Lemeshow goodness of fit test uses the Pearson chi-square from a contingency table comparing expected and observed frequencies of the outcome variable where higher p-values indicate a better fitting model. McFadden's pseudo R^2 is interpreted the same way as a traditional R^2 measure where the value of R^2 is equal to the percent of variance in the outcome that can be explained by the model. However, as this is a pseudo R^2 values are interpreted as *approximate* variation explained. Cohen's f^2 statistic is a measure of effect size calculated based on the pseudo R^2 , where a .02 equals a small effect size, .15 equals a medium effect size, and .35 and above equals a large effect size.

Additionally, there are three measures of the predictive accuracy of the model: percent of cases correctly predicted, sensitivity, and specificity. Percent of cases correctly predicted is equal to the number of true positives plus the number of true negatives divided by the total number of cases. This statistic is a general measure of accuracy. Sensitivity and specificity are more explicit measures of accuracy that identify how well the model predicts positive outcomes (sensitivity), and how well it predicts negative outcomes (specificity). All three measures have a range of 0 to 1 with higher numbers indicating a more accurate predictive model.

I used a binary logistic model to determine what factors predicted whether a kid would have money left over after the book fair. The outcome variable, *leftover money*, is a dichotomous variable where a value of one indicates a kid had money that was unspent at the book fair and a value of zero indicates a kid spent all of his/her

money at the book fair. In this model, positive outcomes were defined as having unspent money, and negative outcomes were defined as spending all of his/her money.

The following variables were included as independent variables: *gender*, *grade*, *money source*, and *money brought*. All variables are defined in the previous section. Descriptive statistics for independent variables are included in Table 15.

Table 14 Descriptive Statistics for Independent Variables included in Logistic Regression Model

	Mean(sd)	Median	Minimum	Maximum
Gender				
Male	.63			
Female	.37			
Grade				
Second	.43			
Fourth	.57			
Money Source				
Self	.22			
Others	.78			
Amount Brought	\$18.06 (\$6.82)	\$20.00	\$5.00	\$32.00

Note: n=67 participants

Book Fair Behaviors of Second- and Fourth-Grade Kids

After examining the likelihood that a kid would have unspent money after the book fair, I compared second- and fourth-grade purchasing behaviors using independent samples t-tests for interval variables, Wilcoxon signed rank for ordinal variables, and the Chi-square test (if expected cell count for all cells was greater than 5) or Fisher's exact test (if expected cell count for one or more cells was less than 5) for categorical variables. Specifically, I examined differences in the following

variables constructed from the pre- and post-book fair surveys⁶: *Money brought*, *Leftover Amount*, *Leftover Use* (categorical), *Number Transactions*, *Purchased First* (categorical), *Purchased Second* (categorical), *Purchased Third* (categorical), and *Satisfaction* (ordinal). Variables are defined in the previous section, *Sources and Uses of Money at the Book Fair*. For t-tests, *p*-values are calculated to determine whether there is a significant difference between the means of the two groups, fourth- and second-grade kids. For Wilcoxon signed rank tests, *z*-scores and associated *p*-values are calculated. Effect sizes (Pearson's *r*) for t-tests and Wilcoxon signed rank tests are also reported where .10 is a small effect, .30 is a medium effect, and .50 is a large effect. For Chi-square and Fisher's exact tests, χ^2 and *p*-values are calculated to determine if there is a significant association between grade and the variable. Odds ratios are reported for Chi-square and Fisher's exact tests.

Money Source and Purchasing Behaviors at the Mock Store

I next moved on to examine results from the mock-store experiment. Kids were randomly assigned to one of two money-source conditions: the money was given to the kid, and he/she could keep any unspent money (*own-money*) or the money was given to the kid, but he/she had to return any unspent money (*other's-money*). I began by investigating whether the source of money affected purchasing behaviors of kids in the mock store. As in the previous analysis, I examined the differences in the following variables using independent samples t-tests for interval variables, Wilcoxon signed rank test for ordinal variables, and Chi-square or Fisher's exact test for

⁶ All variables are measured on the interval scale unless otherwise noted.

categorical variables (depending on whether or not expected cell count was less than five for any cell):

Amount Spent – amount of money spent on items at the mock store

Amount Kept – amount of unspent money kept by kids in the “own money” condition

Amount Returned – amount of unspent money returned by kids in the “researcher’s money” condition

Amount Donated – amount of unspent money donated to classroom teacher by kids

Total Utility – calculated as the sum of the ranked preferences for all items purchased such that the top ranked item equals 15 and the lowest ranked item equals 1

Stated Satisfaction (ordinal) - kids self-reported their satisfaction with the purchases they made on a 5-point happy-face Likert scale; the happy face scale was converted to numerical values with 1 being lowest satisfaction and 5 being highest satisfaction

Purchased RI (categorical) – dummy variable where value equals 1 if the kid purchased the top ranked item, otherwise the value equals 0

Number Purchased – total number of items purchased in the mock store

Average Price – average price of all items purchased in the mock store

Descriptive statistics for all variables are included in Table 16. For t-tests, *p*-values are calculated to determine whether there is a significant difference between the means of the two groups, *own-money* and *other’s-money*. For Wilcoxon signed rank tests, *z*-scores and associated *p*-values are calculated. Effect sizes (Pearson’s *r*) for t-

tests and Wilcoxon signed rank tests are also reported where .10 is a small effect, .30 is a medium effect, and .50 is a large effect. For Chi-square and Fisher's exact tests, χ^2 and *p*-values are calculated to determine if there is a significant association between grade and the variable. Odds ratios are reported for Chi-square and Fisher's exact tests.

The sample was also split by grade to examine whether any non-significant behaviors for the whole sample might be significant if examined in second- and fourth- grade samples separately. The above analyses were re-run with the split samples, and their respective statistics are reported.

Table 15 Descriptive Statistics for Variables generated from the Mock Store Field Experiment

	n	Mean(sd)	Median	Minimum	Maximum
Amount Spent	85	\$4.42(\$0.64)	\$4.75	\$2.75	\$5.00
Amount Kept	85	\$0.11(\$0.33)	\$0.00	\$0.00	\$2.00
Amount Returned	85	\$0.05(\$0.18)	\$0.00	\$0.00	\$1.00
Amount Donated	85	\$0.43 (\$0.55)	\$0.25	\$0.00	\$2.00
Total Utility	85	39.91(11.56)	41	14	66
Stated Satisfaction	73	4.82(.42)	5	3	5
Purchased R1	85	.88			
Number Purchased	85	3.32(.88)	3	2	7
Average Price	85	\$1.40(\$0.29)	\$1.38	\$.83	\$2.75

Note: n=73 for Stated Satisfaction due to recording equipment malfunction

Mock Store Behaviors of Second and Fourth Grade Kids

After examining whether money source affected kids' purchasing behaviors in the school store, I compared second- and fourth-graders purchasing behaviors as well

as their explanations for these behaviors. This incorporated both quantitative and qualitative data. The quantitative variables used in this analysis are: *amount spent*, *amount kept*, *amount returned*, *amount donated*, *total utility*, *stated satisfaction* (ordinal), *purchased r1* (categorical), *number purchased*, and *average price*. These variables are defined in the previous section.

For the qualitative data, I first used open coding to look for themes in kids' responses to the interview question, "How did you decide what to do with the money you received?" From the emergent themes, I identified the following codes to describe how kids explained their decision making processes:

Alternative Uses – kid referenced alternative uses of the money he/she received (saving, spending later, giving back, donating)

Elimination – kid referenced eliminating options

Price – kid referenced the price of good(s)

Prioritizing – kid referenced prioritizing wants

Ranking – kid referenced the ranking task on the iPad

Tradeoffs – kid referenced making trade-offs between items

Utility – kid referenced expected enjoyment with, or usefulness of items

Table 17 includes codes, descriptions, and sample responses. Kids' responses could be assigned multiple codes. For example, one kid mentioned she already had erasers at home so she didn't pick those and she wanted to be able to donate some money. Her response was coded as *elimination* because she eliminated the option of erasers and *alternative uses* because she mentioned wanting to donate money. Dummy variables were created to identify whether a code was present (value of 1) or missing (value of 0) for each kid's response. Frequencies for these qualitative variables are

included in in Table 18. I used independent samples t-tests to compare second and fourth grade student purchasing behaviors measured on the interval level, Wilcoxon signed rank test for variables measured on the ordinal level, and Chi-square or Fisher's exact test for categorical variables. As all explanations for those behaviors (qualitative variables) are categorical, I used Chi-square or Fisher's exact tests. For t-tests, p -values are calculated to determine whether there is a significant difference between the means of the two groups, fourth and second grade kids. For Wilcoxon signed rank tests, z-scores and associated p -values are calculated. Effect sizes (Pearson's r) for t-tests and Wilcoxon signed rank tests are also reported where .10 is a small effect, .30 is a medium effect, and .50 is a large effect. For Chi-square and Fisher's exact tests, χ^2 and p -values are calculated to determine if there is a significant association between grade and the variable. Odds ratios are reported for Chi-square and Fisher's exact tests.

Table 16 Qualitative variable descriptions from mock store interviews

Code	Description	Example Excerpt
Alternative Uses	kid referenced uses of the money other than purchasing items at the mock store (saving, spending later, giving back, donating)	“I really wanted to donate some. And so I tried to figure out how much money I would donate and then how much I would spend.”
Elimination	kid referenced eliminating options	“I have some of the play foam at my house. So I was like I don’t really need it.”
Price	kid referenced the price of goods	“I looked at the things that you had, and then I looked at the price to see how much it was.”
Prioritizing	kid referenced prioritizing wants	“Well I decided as soon as I came in here, my friend had that play foam. It was really cool and I really liked it and I’ve been wanting to get it ever since. So I found the play foam.”
Ranking	kid referenced the ranking task on the iPad	“Um...it was kind of hard because I didn’t know what to get because there’s a lot of cool things so I just remembered the things that I liked on the iPad and I chose those.”
Tradeoffs	kid referenced making trade-offs between items	“I just wanted to not find stuff expensive so then I can buy some more stuff. Because if I buy everything that’s expensive I wouldn’t be able to spend all the things I want to spend.”
Utility	kid referenced expected enjoyment with, or usefulness of, items	“I just really enjoy doing science things so I like the slime. And then the locker buddies, I thought that would be cool to stick on the side of my desk. And the mini erasers I just thought were really cute and useful.”

Table 17 Frequencies for Mock Store Qualitative Variables by Grade

	Frequency Second Grade (n=33)	Frequency Fourth Grade (n=42)
Alternative Uses	27%	60%
Elimination	0%	17%
Price	12%	29%
Prioritizing	9%	26%
Ranking	18%	17%
Tradeoffs	3%	10%
Utility	76%	64%

Results

Sources and Uses of Money at the Book Fair

Of the 80 kids in this sample, 75 reported the amount of money they brought, *money brought*. One kid did not complete the pre-book fair survey as she was out of the classroom, and four kids reported their parents/family members would be attending the book fair and bringing money with them. These four kids therefore did not know how much money they had brought. The 75 kids who did know the amount of money they had brought reported bringing an average of \$16.31 (sd =\$8.54) to the book fair. Of the 79 kids who completed the pre-book fair survey, 71 reported they had brought (or had access through their family members attending the book fair) money. Of these 71 kids, 70.4% reported the source of money (*money source*) was solely family members, 9.9% reported the source of money was solely themselves, and the remaining 19.7% reported the source of money was a combination of family members and themselves. After making purchases at the book fair, 67 kids reported the amount of unspent money (*leftover money*) and 4 kids reported not knowing because their family member had brought the money. The average amount of unspent money was \$1.89 (sd =\$3.09). When asked what would happen to unspent money

(*leftover use*), 51.22% said they would give it back to the person who gave it to them, 41.46% said they would either keep it, spend it elsewhere, or save it, and 7.32% indicated they would donate it, give it to another kid to spend at the book fair, or indicated they did not know what would happen to the money. Of the kids who made purchases, the average number of times kids went to the cashier to make purchases (*number purchases*) was 1.25 ($sd=.50$). In the post-book fair survey kids indicated what item(s) they had purchased. Of the 71 kids who made purchases, three provided answers such as “books” which prohibited coding of their responses to identify if they had purchased one of the items they had identified as “favorite” in the pre-book fair survey. Of the 68 kids who gave sufficient answers, 57% purchased an item they ranked as first (*purchased first*), 15% purchased an item they ranked as second (*purchased second*), and 3% purchased an item they ranked as third (*purchased third*). Finally, kids reported an average satisfaction with their purchases (*satisfaction*) of 4.51 out of 5 ($sd=.78$). All descriptive statistics are reported in Table 19.

Table 18 Descriptive Statistics for Book Fair Variables

	n	Mean(sd)	Median	Minimum	Maximum
Money Brought	75	\$16.13(\$8.54)	\$20.00	\$0.00	\$32.00
Money Source					
Others	71	.79			
Self	71	.10			
Self and Others	71	.11			
Leftover Amount		\$1.89(\$3.09)	\$0.75	\$0.00	\$14.00
Leftover Use					
Give Back	67	51%			
Keep	67	42%			
Other	67	7%			
Number Transactions	69	1.25(0.50)	1	1	3
Purchased First	68	.57			
Purchased Second	68	.15			
Purchased Third	68	.03			
Satisfaction	79	4.51(0.78)	5	1	5

Likelihood of having Leftover Money from the Book Fair

Regression diagnostics revealed no outliers, influential cases, multicollinearity, or small cell size. Of the 80 participants, 71 made purchases at the book fair, but 4 of those did not know how much money they had brought, therefore data were complete for 67 of 80 participants for this analysis. Listwise deletion was used and 13 kids were dropped. The -2 log likelihood for the final model showed a significant change compared to the model with intercept only ($\chi^2=11.862, df=4, p=0.02$). The Hosmer-Lemeshow test shows adequate fit ($\chi^2=13.53, df=47, p=0.06$). McFadden's pseudo R² indicates the model explains approximately 13% of the variance in the outcome variable. This represents a medium effect size ($f^2 = .15$).

The model correctly predicted 64.18% of cases. Specificity was moderate, 57.14%, however, sensitivity higher 69.23%. Three variables significantly predicted

whether a kid will have unspent money after the book fair: *money source, amount brought, and grade.*

Kids who report that at least part of the money they brought came from themselves are 3.92 times as likely to have money left over after the book fair as kids who report all of their money came from a family member ($B = 3.92, p=0.066$).⁷ Amount of money brought also significantly predicts whether a kid will have leftover money. For a one-dollar increase in money brought, a kid is 1.13 times as likely to have money left over ($B = 1.13, p=0.014$). Finally, fourth-grade kids are 3.37 times as likely to have leftover money as second-grade kids ($B = 3.37, p = .072$). Gender was not a significant predictor of a kid having leftover money. Table 20 presents all parameter estimates, Wald statistics, odds ratios, and confidence intervals.

Table 19 Logistic Regression Analysis Summary for Variables Predicting having Leftover Money after Book Fair

Predictor	B	Wald	p	Odds Ratio	95% CI for Odds Ratio	
					Lower	Upper
Money Source-Self	1.37	3.39	0.07	3.92	0.92	16.80
Amount Brought	0.12	6.09	0.01	1.13	1.03	1.25
Grade 4	1.22	3.24	0.07	3.37	0.90	12.67
Male	0.52	.82	0.37	1.68	0.55	5.17
Intercept	-3.15	6.16	0.01	0.43		

Note: n=67

⁷ An a priori power analysis for a logistic regression provides recommended sample size to detect significant effects based on theorized odds ratios for variables of interest, and relative proportion of treatment to control sample sizes. However, given the lack of research on children's mental accounting, there was no theoretical basis for accurate estimation of odds ratios or sample size proportions. Post hoc power analysis revealed the study was underpowered to detect a significant effect for *money source* at the .05 significance level; the sample size required to detect an effect at $p<.05$ is $n=187$. To decrease the likelihood of a Type II error in my analysis, I interpret $p<.10$ as marginally significant.

Book Fair Behaviors of Second and Fourth Grade Kids

I used independent samples t-tests to investigate whether second- and fourth-grade kids exhibited different purchasing behaviors during the book fair, of the measured variables, there were significant differences between second- and fourth-grade kids for the following: amount of money brought, purchasing top choice item, and the number of times at the cash register. Second-grade kids reported bringing an average of \$19.68, while fourth- grade kids reported bringing \$12.27. This is a significant difference with second-grade kids bringing more money than fourth-grade kids ($t = 3.946, df=77, p<.001$) with a large effect size ($r =.57$). Second-grade kids purchased a top choice item 75% of the time, while fourth-grade kids purchased a top choice item only 45% of the time. There is a significant association with second-grade kids purchasing a top choice item ($\chi^2 = 6.060, df=1, p=.014$). The odds of a second-grade kid purchasing a top choice item was 3.67 times higher than that of fourth-grade kids. Finally, second-grade kids visited the cash register an average of 1.52 times, while fourth-grade kids visited the cash register an average of 1 times. This is a significant difference with second-grade kids visiting the cash register more times ($t = 4.784, df=32, p<.001$) with a large effect size ($r =.65$).

Money Source and Purchasing Behaviors at the Mock Store

After analyzing the behaviors of kids at the book fair, I analyzed the behaviors of kids in the mock store field experiment, first comparing the behaviors of kids by source of money. Kids were randomly assigned to one of two conditions. In the first condition, kids were allowed to keep their unspent money; in the second condition, kids had to their return unspent money to the researcher. The only behavior with significant differences between conditions was purchasing the top rated item. Kids in

the *own-money* condition purchased their top ranked item 95.7% of the time, while kids in the *other's-money* condition purchased a top choice item only 79.5% of the time. There is a significant association with kids in the *own-money* condition purchasing a top choice item ($\chi^2 = 5.313, df=1, p=.039^8$). The odds of a kid purchasing a top choice item in the *own-money* condition was 5.68 times higher than that of a kid in the *other's-money* condition.

As there were no other significant differences between kids in the own-money and other's money conditions, the sample was then split by grade to examine whether there were differences in the sub-samples. I will first discuss the fourth-grade split sample, followed by the second-grade split sample.

Fourth-grade kids in the *own-money* achieved an average utility of 40.62, while fourth-grade kids in the *other's-money* condition achieved an average utility of 33.82. This is a significant difference with kids in the *own-money* condition achieving higher utility than kids in the *other's-money* condition ($t = 2.169, df=46, p=.04$) with a medium effect size ($r =.30$). Additionally, fourth -grade kids in the *own-money* condition purchased their top ranked item 96% of the time while kids in the *other's-money* condition purchased their top ranked item 77% of the time. There is a significant association with *own-money* condition fourth-grade kids purchasing a top choice item ($\chi^2 = 3.884, df=1, p=.08$). The odds of a fourth-grade kid in the *own-money* condition purchasing a top choice item was 7.35 times higher than that of fourth grade kid in the *other's-money* condition.

In contrast, second-grade kids in the own-money condition achieved an average utility of 40.20 while second-grade kids in the other's-money condition

⁸ The expected cell size for one cell was less than five, so Fisher's exact test *p*-value is reported here.

achieved average utility of 46.35. This is a significant difference with second-grade kids in the own-money condition achieving lower utility than kids in the other's-money condition ($t = 1.681, df=35, p=.10$) with a small to medium effect size ($r =.28$). Additionally, second-grade kids in the other's money condition purchased items with an average price of \$1.28 while kids in the own-money condition purchased items with an average prices of \$1.51. This is a significant difference with second-grade kids in the other's-money condition purchasing items with a lower average price than kids in the own-money condition ($t = 2.62, df=35, p=.01$) with a medium to large effect size ($r =.44$). Finally, second-grade kids in the other's-money condition purchased an average of 3.88 items while kids in the own-money condition purchased an average of 3.2 items. This is a significant difference with second-grade kids in the other's-money condition purchasing more items than kids in the own-money condition ($t = 2.36, df=35, p=.02$) with a medium to large effect size ($r =.40$).

Mock Store Behaviors of Second and Fourth Grade Kids

After examining kids' behaviors in the split sample, I investigated differences between second- and fourth-grade students with respect to purchasing behaviors in the mock store and explanations for those behaviors. With respect to purchasing behaviors, second-grade kids spent an average of \$4.68 while fourth-grade kids spent an average of \$4.22. This is a significant difference with second-grade spending more than fourth-grade kids ($t = 3.24, df=82.96, p=.001$) with a medium effect size ($r =.33$). Additionally, second- grade kids purchased an average of 3.51 items while fourth-grade kids purchased an average of 3.17 items. This is a significant difference with second grade purchasing more items than fourth grade kids ($t = 1.84, df=83, p=.07$) with a medium effect size ($r =.33$). Based on these purchases, second-grade kids

achieved average utility of 43.03 while fourth- grade kids achieved an average utility of 37.50. This is a significant difference with second grade achieving higher utility than fourth-grade kids ($t = 2.237, df=83, p=.03$) with a small to medium effect size ($r =.24$). Finally, while there was no significant difference between the amount kept or returned between grades, there was a difference in the amount donated. Second-grade kids donated an average of \$0.22 while fourth-grade kids donated an average of \$0.58. This is a significant difference with second grade donating less than fourth grade kids ($t = 3.24, df=82.96, p=.002$) with a medium effect size ($r =.33$).

With respect to explanations for purchasing behaviors, fourth-grade kids used elimination in their explanations 17% of the time while second-grade kids never referenced elimination. There is a significant association with fourth-grade kids referencing elimination ($\chi^2 = 6.01, df=1, p=.02$).⁹ Fourth-grade kids also referenced prioritizing 26% of the time while second-grade kids referenced prioritizing 9% of the time. There is a significant association with fourth-grade kids referencing prioritizing ($\chi^2 = 3.56, df=1, p=.06$). The odds of a fourth-grade kid referencing prioritizing was 3.55 times higher than that of second-grade kids. Fourth-grade kids referenced the price of an item in their explanations 29% of the time while second-grade kids referenced price only 12% of the time. There is a significant association with fourth-grade kids referencing price ($\chi^2 = 3.56, df=1, p=.06$). The odds of a fourth-grade kid referencing price was 2.9 times higher than that of second-grade kids. Finally, in addition to talking directly about purchases, fourth-grade kids referenced alternatives to spending in 60% of their explanations while second-grade kids referenced

⁹ The odds of a fourth grade kid referencing elimination cannot be calculated as no second grade kids reference elimination resulting in a division by zero.

alternatives in only 27% of their explanations. There is a significant association with fourth-grade kids referencing alternatives to spending ($\chi^2 = 7.76, df=1, p=.01$). The odds of a fourth-grade kid referencing alternatives to spending was 3.92 times higher than that of second-grade kids. The second-grade kids referenced utility 76% of the time. This was more than they referenced any other criteria. Although this was greater than the frequency with which fourth-grade kids referenced utility (64% of the time), there was no significant association with second-grade kids referencing utility compared to fourth grade kids ($\chi^2 = 0.03, df=1, p=.86$).

Discussion

The book fair surveys and mock store experiment provided an opportunity to more closely examine the semi-autonomous purchasing behaviors of second- and fourth-grade kids. Based on my observations during Phase 1, I hypothesized that kids had access to money and were able to make semi-autonomous spending decisions, that is, decisions without the direct influence of an adult. Book fair survey data indicates that a majority of kids had access to money, and did not have an adult present while they were making purchasing decisions. This is consistent with my ethnographic observations. Additionally, most kids are spending other people's money at the book fair, and this changes the amount of money they spend. Specifically, kids who report bringing their own money to spend are more likely to have unspent money after the book fair than those kids who report that all of their money came from other people. This is consistent with behavior I observed at the fall book fair. I observed that kids seemed to be motivated to spend their parents' money, but save their own money. While my observations of book fair behavior were limited to fourth- grade kids in the

fall, evidence from the spring book fair suggests that second as well as fourth grade kids engage in this behavior.

This behavior is also consistent with the theory of mental accounting. Kids have mental accounts, and use money from “others” differently from how they used money from “self”. Money from others should be spent, whereas money from “self” should, in part, be saved. I hypothesized that kids were motivated to spend all of their parents’ money because they would have to return any unspent money, however, kids who are using other people’s money are not more likely to report that they will return unspent money than kids who bring their own money. This could be because their parents are not expecting unspent money to be returned, or it could be that kids do not plan on returning unspent money (regardless of their parents’ expectations).

Unfortunately, I was not able to replicate these observed behaviors in the mock store field experiment.

In the mock store experiment, kids did not spend less money if the money was theirs as opposed to the other’s money. I propose two reasons why I was not able to replicate the result from the book fair. First, the items in the store may have been too appealing. I purposefully selected items I observed were popular based on purchases at the school store, at the book fair, and based on items kids played with during the school day. It may have been that for most kids, the items were very desirable and therefore they chose to spend as much money as they could to obtain them. Second, the amount of money each kid received, \$5.00, may have been too low in conjunction with the desirability of the items for sale. These kids, who had access to \$16.00 on average at the book fair, may have needed to receive a larger sum of money in order for the utility of the money to be greater than the utility of the goods they could

purchase. Future studies about kids' autonomous spending should consider varying or increasing the amount of money kids have to spend to test whether an increase would result in replicating behaviors observed at the book fair.

While there was no difference in the amount spent based on source of money, the source of money was significantly associated with purchasing the top ranked item. Kids who spent their own money were more likely to purchase their top ranked item. As there were no other significant differences for the full sample, I split the sample by grade to look at differences within grade by source of money. Kids in fourth grade who were spending their own money achieved higher levels of utility than fourth-grade kids spending other people's money. This is additional evidence that kids in fourth grade use money from different sources differently. When it was their own money, kids placed a higher value on spending money "wisely" than they did when spending other people's money. This suggests that money from different sources is sorted into different "use" accounts and is not fungible.

However, this finding is not consistent with the behavior of second-grade kids. Kids in second grade achieved higher utility when they were spending other people's money. Although they spent the same amount of money regardless of source, they made better choices when they weren't allowed to keep the unspent money. This can also be seen in the types of items they purchased. Second-grade kids who were spending other people's money, purchased more items and these items were cheaper than the items purchased by kids who were spending their own money. Although the behavior is not consistent with the behavior of the fourth-grade kids, it is further evidence that kids view money differently based on the source of the money and is evidence that kids are engaged in mental accounting.

Given the evidence that kids do behave differently depending on the source of the money they have access to, future studies should investigate explanations for those behavioral differences. For example, operations research literature and land conservation literature, among others, study how to optimize behavior in scenarios like the mock store where there is a fixed budget and various options for allocating that budget (for an example see: Messer, Kecinski, Tang, & Hirsch, 2016). Using categories employed by these researchers may explain kids' behaviors. It may be that fourth-grade kids are using a *benefit targeting method* in combination with *sequential selection*. A *benefit targeting method* compares options based on benefits without considering costs. Sequential selection occurs when choices are made sequentially vs. simultaneously. Preliminary analysis of qualitative data supports this hypothesis. Fourth-grade kids reference both elimination and prioritizing in their decision making explanations more often than do second grade kids. Fourth-grade kids are picking the item they want most (*benefit targeting*) and mentally "purchasing" that item before deciding what to do with the rest of the money they have access to (*sequential selection*). This may explain why fourth-grade kids end up with lower utility than the second grade kids. The second-grade kids seem to be using a *knapsack method* where they simultaneously consider all options, instead of sequentially consider options. By considering all options, without first prioritizing or eliminating items, they are able to achieve greater total utility than the fourth-grade kids are able to achieve. Further investigation of qualitative and quantitative data from this study may reveal evidence to support or refute this hypothesis. Additionally, future studies could be designed to specifically investigate how kids make their decisions, and how these decisions affect the utility they achieve.

Conclusion

In Phase 1 of this study I observed kids not only had access to more money than I anticipated, but they used it in ways I had not anticipated. Contrary to my expectations, kids made semi-autonomous decisions about how and when to spend the money to which they had access. Given the semi-autonomous nature of their spending, these behaviors fit within the parameters of my study: to study the economic world of kids, identifying economic problems important to kids, and exploring how they make sense of and solve those problems. By using a survey to collect data about natural behaviors at the book fair, and using the mock store field experiment to attempt to replicate those behaviors, I further developed my understanding of how kids solve economic problems involving purchases with money. Kids' behaviors are consistent with the theory of mental accounting in that they behave differently depending on the source of money to which they have access. At the book fair, this manifests itself as spending less money when the source of the money is themselves, and more money when the source is others. In the mock store, this manifests itself differently by grade. Kids in fourth grade achieve higher utility (satisfaction) when they are spending their own money, while kids in second grade achieve higher utility (satisfaction) when they are spending other people's money. Optimization literature in operations and land conservation may provide explanations for these behaviors, and future studies should investigate how kids are making decisions, and under what optimization criteria they are operating.

Chapter 6

Discussion

A Second Grade Economics Lesson

“Why might it be better to wait than to have something now?” Mrs. O’Connor asked the second-grade kids after they had watched a Cookie Monster music video about impulse control. The kids looked blankly at the teacher and at their desks. No one offered an answer. In an effort to guide the conversation, Mrs. O’Connor then asked, “would it be better to buy something with a credit card now, or save and buy it later?” The kids unanimously responded it would be better to buy it now. Mrs. O’Connor, dismayed, tried to convince them waiting was better, “When you buy something with credit” she explained, “you have to pay back more than it costs, like 115% of the cost. That’s how banks make money, by charging you. They don’t just give you money.”

The kids were listening closely as Mrs. O’Connor continued, “My daughter used to pay her credit card balance in full every month when she lived at home. Then, when she moved out of the house and into a house with a roommate, the roommate told her to just pay a little each month.” Mrs. O’Connor paused here and asked the kids, “Was that a good idea?” All of the kids emphatically agreed that paying a little at a time was a great idea, “Yeah! Yeah! A little at a time!” they exclaimed. Mrs. O’Connor pursed her lips and wrinkled her forehead, then reiterated “But you would have to pay more.”

At this point, Hannah, who was clearly frustrated, announced, “This doesn’t make any sense” and Arianna added, “I’m going to tell my mom not to do that.” The conversation ended here as it was time for the kids to pack up before going to art.

While Mrs. O'Connor's initial intent may not have been to teach kids about the adult economic world, it quickly became the focus. In an effort to teach them why it is better to wait, she used an example from her own experience, buying on credit. Unfortunately, the kids in her class did not have a similar experience. They responded to her question based on their own experiences: it is better to have things now. This preference is evident when kids' trade with each other. No kid prefers to wait to get the good they want.

Mrs. O'Connor insists that waiting is better and tries to convince the kids of this with yet another piece of evidence that does not take kids' naïve theories into account. She tells the kids that banks don't just give you money, they charge you to borrow money. However, in the economic world of kids, this is not how borrowing works. Thinking like a kid: If someone borrows scissors from you, you expect them to give back your scissors. You don't expect them to give back the scissors and a pencil.

It is clear the kids have not changed their naïve theory about borrowing in response to Mrs. O'Connor's explanation, because when she tells the story of her daughter and her credit card payments, the kids are still big fans of only paying a little bit, not the whole thing. This is also consistent with their naïve economic theories: why give someone a lot, when you can give them a little? Why give someone all of your snack today if instead you can just give them some of your snack for the next couple days?

At this point, there are two different responses that reveal kids' thinking. Hannah has heard Mrs. O'Connor, but is unwilling to adjust her naïve economic theory about how consuming and borrowing works. She announces that it "doesn't make any sense", a clear indication she is not incorporating the new knowledge into

her existing theory. Arianna, on the other hand, has decided she is “going to tell her mom not to do that”. Arianna, however, does not indicate any changes in her own behaviors. This suggests she has fragmented her naïve theory. In Arianna’s mind there are now two ways things work: one way for grown-ups and one way for kids. Based on this interaction, it is not possible to tell how this fragmented theory will manifest. Will she tell her mom that credit cards are bad? Will she tell her mom that paying for things a little at a time is bad? Will she be able to distinguish between credit and debit cards, or will she assume that grown-ups should always pay in cash?

This exchange illustrates how instruction that does not first address kids’ prior knowledge and beliefs, their naïve theories, can result in undesired effects; hybrid naïve economic theories that are no closer to expert theories after instruction than before instruction. Designing effective instruction is dependent upon understanding kid’s naïve economic theories.

My dissertation is motivated by a desire to understand how kids think about economics before they learn economics in formal school settings. Unlike in science and math content areas, little is known about how kids think about the subject of economics. Socio-constructivist learning theory contends that this is problematic for kids’ learning. Specifically, new learning should build up on previous understandings and knowledge. If educators are unaware of kids’ previous understandings and knowledge, they cannot build on this knowledge.

The naïve theory framework provides a way to conceptualize kids’ prior understandings. Kids’ naïve theories are developed based on relationships between causes and effects that they experience within a specific domain. Naïve theories then serve as models for how kids understand the world. When kids are presented with new

experiences, they test them against their theories, and if necessary, revise their theories to reflect what they have learned from the new experience. It is important for educators to be aware of these naïve theories because if educators present kids with new knowledge without first addressing naïve theories, kids may incorporate the new knowledge into their naïve theories in unexpected ways. For example, they may try to make the knowledge fit into their existing theory. Thus, instead of replacing their naïve theory with the new information presented, they create a hybrid theory based on both the old and new information. This hybrid theory is most likely not aligned with expert theories, and is therefore problematic. Curriculum can be strengthened by ensuring it is designed to first acknowledge kids' naïve theories, then guide their learning in a way that provides new experiences to help them develop new theories that are aligned with expert theories.

In content areas such as mathematics and physical and life sciences, kids' naïve theories have been extensively studied, and this research has led to changes in how these subjects are taught. In economics, however, there is very limited research into kids' naïve theories about the economic world. Research in the area of how kids think about economics has focused on how kids understand and become socialized in the economic world of adults, specifically a market economic system. However, the economic world of children is rarely acknowledged by researchers, and therefore rarely studied. Preliminary studies in this area have provided evidence that kids do have an autonomous economic world, defined as economic problems that are identified and addressed among children, without direct interaction from adults. In this study, I expanded upon these initial findings through a multiphase mixed methods study.

Kids' Naïve Economic Theories

The section below presents findings from Phases 1 and 2 for both the role of relationships in kids' resource allocation decisions and the ways in which kids understand the value of money. I begin each section with an overview of each phase's contribution and conclude with a merging of the analysis from both phases to create revised theories of kids' naïve economic theories as they relate to resource allocation decisions and the value of money.

The Role of Relationships in Resource Allocation

In my ethnographic exploration of the economic world of kids, I found strong evidence for a system of resource allocation. Their system involves allocating both tangible possessions and access to physical and social spaces. Furthermore, their allocation system is guided by rules that are both negotiable and guided by relationships in their social network. When kids make decisions about sharing, lending, gifting, and trading, they are willing to negotiate terms. Often, these terms reflect a kid's relationship with the potential recipient, or the potential recipient's position within the social hierarchy.

In the first experiment, I focused on how kids use relationships with potential recipients to determine how resources will be allocated. Kids played a dictator game and earned candy; they then had the opportunity to share it with four anonymous and four named recipients. The named recipients represented a best friend, a central kid, an isolated kid, and an acquaintance. While prior research shows kids have an equality preference, this study finds kids only exhibit this preference when the recipients are anonymous. When recipients are named, kids are significantly less likely to divide resources equally among recipients. Results from this experiment provide strong

evidence that kids make allocation decisions based on the relationship they have with the recipient, sharing more candy with best friends than with any other group, and sharing more candy with central kids than with isolated kids.

Analysis from Phase 2 merged with the analysis from Phase 1 resulted in a revised theory of kids' naïve economic theories about resource allocation. Analysis from the dictator game provided additional evidence that kids allocate resources based on relationships, thus strengthening the basis for the theory developed in Phase 1. Additionally, qualitative evidence from interviews conducted after the experiment enhanced the theory by adding kids' explanations for their own behavior. Kids often mention that they want to give, not just to people they know, but to people they know who are also nice to them. This was often a disincentive for kids to give to the anonymous recipients. Kids described being hesitant to allocate resources to the anonymous recipients because they did not want to allocate candy to people who they potentially didn't know, or to people who had been mean to them. While the experiment only provided kids the opportunity to share candy with potential recipients, in Phase 1 I observed multiple ways of allocating resources, of which sharing was only one way. Phase 1 provided evidence that kids consider relationships not only when they share, but also when they trade and lend. Together with the evidence from Phase 2, this provides a basis upon which to conclude that kids' resource allocation decisions are affected by relationships with the potential recipient and that the resource allocation with close friends and central kids is more likely to be advantageous to the recipient.

The Differential Value of Money

A second important finding from this study is that kids are aware of the adult economic world, and are eager participants. Although their participation is limited, for example, to being consumers at the school store or producers when selling handmade goods in their neighborhood, kids seem to construct meaning in the adult economic world using the rules of their own economic world. This application of naïve theories from the kids' economic world to the adult economic world has interesting consequences. While their theories work well to explain the causes and effects in their own economic world, they are less than perfect at explaining relationships in the adult economic world. For example, while adults recognize that prices are more likely to reflect the seller's profit motive in equilibrium with the buyer's willingness and ability to pay, kids see prices in the same way they see trades among kids. Rules for trades differ based on the relationship between the two parties, and therefore reflect a desire to arrive at a price that is fair and does not take advantage of the other person (perhaps this means being more fair to kids with whom you are close friends, and less fair to kids who are either not popular or not your friends).

Finally, kids seem to make decisions about the uses of money that, while different from expert theories about consumption, are consistent with how lay adults make decisions. Kids seem to assign differential values to money based on its source. Specifically, money from parents has less value than the kid's own money, consequently kids are more willing to spend their parent's money than they are to spend their own money.

In the second experiment I focused on how kids made decisions about the uses of money when the sources of money differed. I combined data from a survey conducted before and after kids attended their school's spring book fair with a field

experiment where kids had the opportunity to make purchases at a mock store using either other people's money, or their own money. Results from the survey conducted during the school's book fair provide some evidence that kids are more likely to not spend all of their money if at least part of the money is theirs, as opposed to it all being another person's money.

While the survey findings are not replicated in the mock store field experiment, kids do engage in different purchasing behaviors depending on whether the money is theirs or someone else's. Specifically, second-grade kids are able to achieve higher levels of utility from their purchases when they spend other people's money whereas fourth-grade kids achieve higher levels of utility when they are spending their own money. Preliminary analysis of qualitative data from the mock store experiment suggests this might be due to how kids make purchasing decisions. Kids in fourth grade are more likely to immediately exclude some items and prioritize other items, while second-grade kids appear to be more flexible in how they group the items they will purchase. Thus, through flexible grouping the fourth-grade kids are able to make combinations of items that result in higher achieved utility.

The analysis of the book fair survey and mock store field experiment enhanced the initial theory about how kids use money from different sources. Based on Phase 1, I theorized that kids value money differently, and that this value differential resulted in increased spending of other people's' money compared to a kid's own money. In Phase 2 I found mixed evidence to support the spending differential: results from the book fair survey supported my initial theory, while results from the mock store field experiment did not support my theory. Kids did report having more money left over at the book fair when they were spending their own money, but at the mock store, there

was no difference in the amount of money spent between kids who spent their own and other people's' money. However, results from Phase 2 did provide evidence that other aspects of kids' spending behaviors are affected by the source of money, and these differences are different for the second- and fourth-grade kids. In contrast to the first experiment where evidence strengthened the theory proposed in Phase 1, the second experiment served to refine the theory proposed in Phase 1. Specifically, kids may be sensitive to the amount of money, not just the source of money, and second- and fourth-grade kids may have distinct ways of responding to the sources of money. While kids in the book fair had access to an average of \$16, these same kids in the mock store experiment only had access to \$5. This suggests that the amount of money available may be a mediating factor in the relationship between sources of money and uses of money. Secondly, second- and fourth-grade kids may have fundamentally different methods for making decisions as consumers in the adult economic world.

Implications

The implications for this study are twofold. First, as an initial investigation of kids' naïve theories about resource allocation, findings from this study have implications for economics curriculum and instruction. Second, as a novel methodological approach to the study of kid's naïve economic theories, the method and findings have implications for future research in economic education. Below I describe implications for curriculum followed by implications for future research.

Curriculum Implications

The Voluntary National Content Standards in Economics (the Standards) are divided into 20 individual standards, with embedded benchmarks at the fourth, eighth,

and twelfth grade levels. The Standards represent knowledge and thinking that is consistent with expert understandings of economics theories and concepts. The benchmarks are designed to scaffold learning so that by twelfth grade, students have the knowledge and skills to be economically literate. The benchmarks are divided into elementary, middle, and high school levels, however initial findings from this study suggest there may be a benefit to further narrowing the benchmark grade bands. Between second and fourth grade, this study provides evidence that kids' naïve economic theories are different. Specifically, kids' conceptions of the function of money and how jobs are determined appear to shift away from being determined by relationships. Given this, further refining the benchmarks to reflect early and late elementary grades could help guide curriculum to be more closely aligned with kids' naïve economic theories.

Additionally, the current benchmarks follow a backward design, starting with the end goal for high school graduates and scaffolding backwards to elementary-aged kids. Given the limited research on kids' naïve economic theories, these benchmarks represent best guesses about what kids should be able to do at each level. Without available research on kids' naïve economic theories, these benchmarks are based on benchmark writers' knowledge of cognitive development and their experiences working with kids. Given that socio-constructivist learning theory prioritizes kids' prior understandings in designing curricular progressions, perhaps this backward mapping could be balanced with a forward mapping based on kid's naïve theories. For example, findings from this study suggest kids' understandings about resource allocation are strongly tied to role of social networks. This would suggest that economics' benchmarks at the elementary level should reflect the role of relationships

in resource allocation. Currently, the benchmarks guide kids toward an understanding of how a market economic system functions, however by placing more emphasis earlier on alternative economic systems, curriculum designers may be more effective in helping kids develop their naïve economic theories about resource allocation so that those naïve economic theories more closely align with expert economic theories about resource allocation, including allocation in market economic systems.

Adjusting benchmarks, either in frequency, or in content, has implications for instruction at the classroom level. For example, the Grade 4 Benchmark for *Standard 3: Allocation* in the Standards requires kids to discuss the advantages and disadvantages of different methods of allocation. However, this standard does not address motivations for these different methods of allocation. Since relationships seem to be a strong influence on how kids believe resources should be and are allocated, perhaps specifically incorporating not only advantages and disadvantages, but also reasons why people allocate differently would encourage conceptual change in kids' naïve theories. How might this look in a classroom? Perhaps kids spend time thinking about the resources they control and have the power to allocate, or even engage kids in an activity where they make real allocation decisions (similar to the dictator game experiment in this study). Afterwards, the kids and teacher could talk about how kids decided what to do, and why. A teacher could emphasize that we often allocate resources based on our relationships and lead a discussion about the advantages and disadvantages of making choices based on relationships. The list of disadvantages could lead to a wider discussion and possibly time for kids to try allocating in different ways, and end with repeating the process of reflection and discussion about advantages and disadvantages. Since kids are not likely consciously aware of and able

to verbalize their naïve theories (Barrett & Buchanan-Barrow, 2005), leading kids through an exploration of what their current theory of allocation looks like, challenging it by discussing limitations, and then introducing and allowing them to practice alternative methods of allocation may affect conceptual change and therefore development of naïve theories more consistent with expert theories of resource allocation.

While I have offered the above examples of how findings might affect economic education standards and curriculum, I am far from recommending that the above approach is superior to current methods, or even that it should be implemented. These findings are the result of a single study and therefore may not be generalizable to a wider population. In physical and life sciences, investigations into naïve theories date back to the 1970s, and naïve theory development has been thoroughly investigated in these content areas. Additionally, intervention studies have been conducted to ensure that curriculum sequencing is consistent with the kind of theory development that effectively guides kids from naïve to expert in the respective areas. The findings in this study require further investigation before they are interpreted in ways that affect curriculum design and implementation.

Research Implications

This study presents several implications for future research, and some of these implications stem from the limitations of the current study. First, this study was situated in a specific context and setting, thus limiting generalizability of findings. The kids who participated in this study all came from two grades within a single school that had a fairly homogenous population with respect to race/ethnicity and income. Additionally, the demographic characteristics of the school vary significantly from the

demographic characteristics of the wider community. Given that economics is social system, it is strongly influenced by the people who make up that system. Thus, it is likely that these findings are representative of the school population, and not of the wider community of which the school is a part.

Second, this study was limited by sample size. This is especially relevant for interpreting the results from experiments carried out in Phase 2. The small sample size may have affected power to detect significant effects, or may have resulted in significant findings that would not have been significant given a larger sample.

Finally, this study was limited by the time frame and resources available to the researcher. This study was designed to be conducted within an academic year so as to preserve the social system of the kids in the study. Given that I was the primary researcher responsible for both collecting data in Phase 1 and simultaneously designing experiments and collecting data in Phase 2, I was limited in the number of experiments I could design and run.

Given these limitations, there are recommendations for future research. First, replicating the study design, either in full or in part, in different settings with different samples, would expand our understanding of kids' naïve economic theories. Working with kids from different geographic locations with different demographic characteristics would address the generalizability of the study findings. Additionally, as this study represents a snapshot of kids' thinking, replicating the study with samples of different ages would help develop an understanding of the progression of naïve theory development.

Second, this study specifically addresses two areas of kids' naïve economic theories: the role of relationships in sharing, and the differential value of money from

different sources. Future studies should examine other aspects of kids' naïve economic theories. For example, in the dictator game, I limited my investigation to sharing behaviors, however kids engage in a wide range of allocation behaviors in addition to sharing. These behaviors include trading and borrowing/lending. Studies that examine these behaviors both through ethnographic and experimental methods would deepen our understanding of the rules kids use in resource allocation, and thus their naïve economic theories.

Finally, the design of the study itself has implications for future research. Prior research in the area of kids thinking about economics has primarily relied on interviews to uncover kids' thinking. This study, however, used a mixed methods framework to delve more deeply into the ways kids think. Instead of assuming I knew the economic problems faced by kids, I became a participant-observer during the school day. This allowed me to discover economic problems as they were experienced by kids. I was able to observe the ways in which kids approached and attempted to resolve these problems. I was immersed in their school lives, and this gave me an invaluable perspective about how they negotiate their autonomous economic world.

Using ethnographic methods allowed me to see not only that kids have different sets of economic problems than adults, but they hold fundamentally different views about resources than adults do. Where adults and economic experts have well defined rules about ownership and the property rights conveyed by that ownership, kids seem to lack distinct ownership roles, instead relying on varying levels of control over resources. For example, kids do not own swings on the playground, or the iPad they use during library, but they can exert control over those resources, therefore they have the ability to make allocation decisions about how they are used and by whom.

Armed with this deep knowledge about what economic problems kids defined as important and the ways in which they appeared to solve those problems, I shifted from an ethnographic approach to an experimental approach. By utilizing an experimental approach, I tested my hypotheses about kids' naïve economic theories in a controlled setting where I manipulated one variable at a time to see if behaviors I observed in natural setting could be replicated. The experimental method also allowed me to expand my sample from one class of fourth and one class of second grade kids to three classes of each grade. By expanding my population from a class to a grade, I provided external validity to the theory I developed. Finally, perhaps the greatest strength of the mixed methods approach can be recognized in the merging of analysis from the ethnographic and experimental phases. By merging the analysis of the qualitative and quantitative results, I developed a rich dataset that resulted not only in meaningful findings about kids' naïve theories, but also created opportunities to continue exploring and developing research in the field of kids' naïve economic theories.

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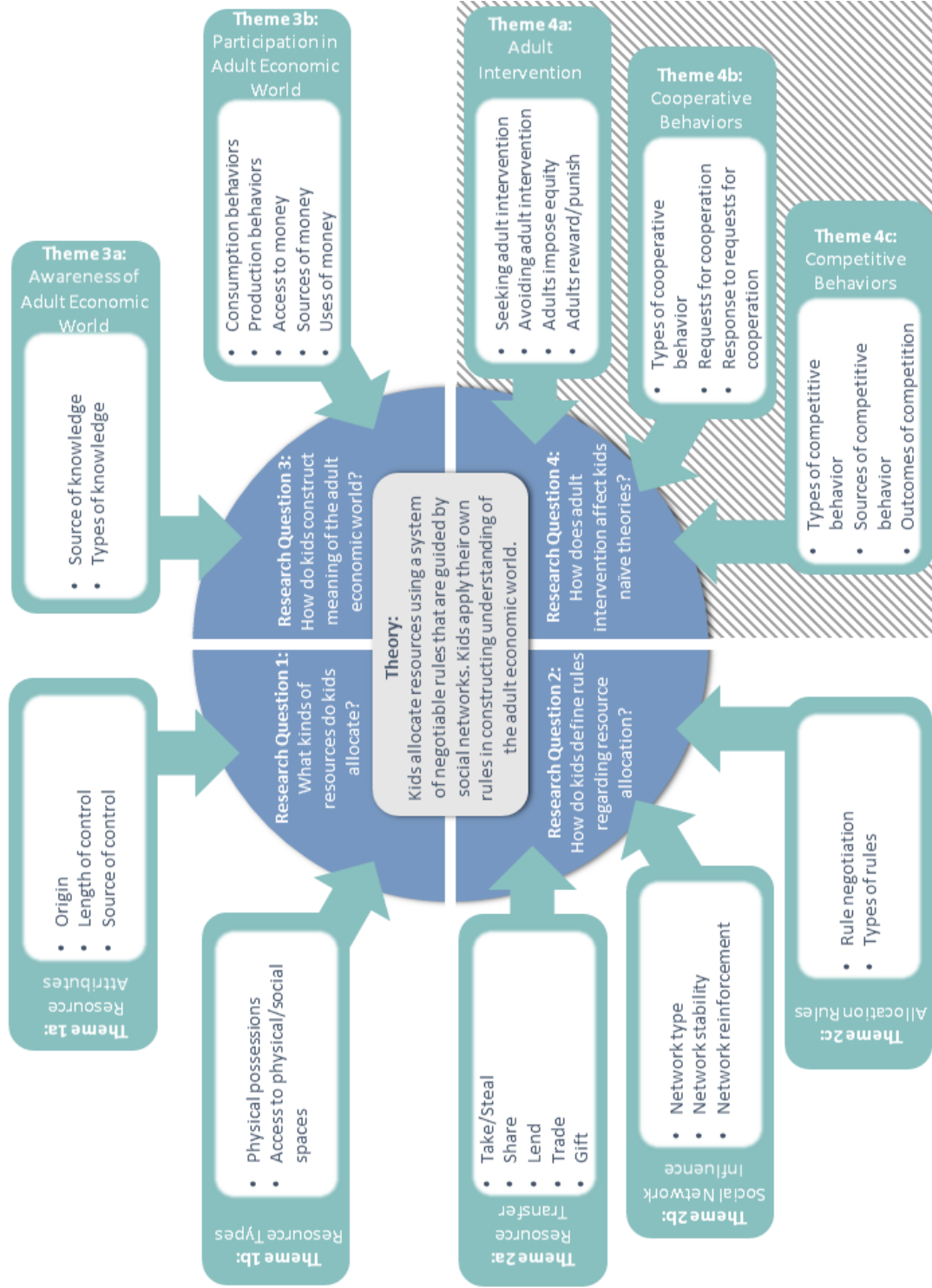
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Appendix A

ETHNOGRAPHIC CODE MAPPING

Using constant comparative analysis (Glaser & Strauss, 1967), I first coded all of my field notes using open coding. These codes are represented by the white rectangles in the figure below. As I coded, I refined my thinking and developed themes that united some groups of codes, and distinguished those group of codes from other groups of codes. These themes are represented by the green rectangles on the figure below. Next, I developed four research questions guided by these themes. The research questions are represented by the four sectors of the blue circle. Finally, I developed a theory of children's naïve theory of economics by synthesizing the analysis from the research questions. The theory is represented by the grey rectangle in the center of the figure. One important note is the greyed-out sector corresponding to Research Question 4. Although Research Question 4 represents an important aspect of kids' naive economic theories, it is not directly related to the autonomous economic world of children, therefore, it is not included in the ethnographic portrait (see Chapter 3). Research Question 4 is an area I will continue to explore in future research.



Appendix B

PARENT SURVEY

Part1:

The first part of the survey asks a couple of questions about you.

1. What is your first name?
2. What is your last name?
3. What is your relationship with your child?
 - Mother/Stepmother
 - Father/Stepfather
 - Other _____

Part 2:

This next part of the survey asks a few questions about your child.

4. What is your child's birthday?
5. What is your child's gender?
 - Male
 - Female
6. What is your child's ethnicity?
 - White
 - Black or African American
 - American Indian or Alaska Native
 - Asian
 - Native Hawaiian or Pacific Islander
 - Other
7. Is your child Hispanic?
 - Yes
 - No
8. How many male siblings does your child have?
9. How many female siblings does your child have?
10. What is your child's street address?

11. What is your child's zip code?
12. How many years has your child attended Brandywine Springs School?
13. What grade is your child in?
 - second grade
 - fourth grade
 - other _____
14. Who is your child's teacher?

Part 3:

The third, and final, part of the survey asks questions about your child's experience making purchases.

15. How often does your child make purchase decisions on his/her own?
 - Daily
 - Weekly
 - Monthly
 - Never
16. What kinds of purchase decisions does your child make on his/her own?
17. How often does your child make purchase decisions with an adult's help?
 - Daily
 - Weekly
 - Monthly
 - Never
18. What kinds of purchase decisions does your child make with an adult's help?

Appendix C

IRB APPROVAL LETTER



RESEARCH OFFICE

210 Hullihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
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DATE: September 16, 2015

TO: Amanda Jennings
FROM: University of Delaware IRB

STUDY TITLE: [798079-1] Children's Economic Thinking

SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: September 15, 2015
EXPIRATION DATE: September 14, 2016
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # (7)

* This Approval for Phase 1 Only

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.