

**At-Risk Preschool Children's Exposure to Amounts and Types of  
Literacy Instruction**

by

Laura Kathleen Matters Herold

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Doctoral Committee:

Professor Susan B. Neuman, Co-chair  
Professor Annemarie Sullivan Palincsar, Co-chair  
Associate Professor Kai Schnabel Cortina  
Professor Nell K. Duke

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## Abstract

Early reading ability critically affects children's long-term academic outcomes. However, children from disadvantaged backgrounds tend to begin formal schooling with fewer of the key skills and abilities needed for successful reading than do their more privileged classmates. For this reason, investments have been made in targeted preschool programs that focus to a great extent on increasing at-risk children's early language and literacy abilities. However, we know very little about the language and literacy instruction that teachers present to at-risk preschoolers in such programs. In this dissertation, I examine teacher-log data on the enacted language and literacy instruction provided in a group of Michigan state-funded preschools. I seek to shed light on: (a) the time teachers in targeted preschool programs devote to literacy instruction, (b) the literacy skills they most commonly teach to their students, (c) the extent to which they focus on key literacy skills and related instructional strategies with their students, and (d) the instructional strategies related to language and literacy development they employ within the content domain of science. My results suggest that just over 13 minutes of language and literacy instruction may be provided to the average child per half day of instruction, and that key literacy skills and instructional strategies known to predict later achievement may not be taught a large proportion of the time. These initial findings suggest a potentially problematic situation for at-risk children, who need additional instruction if they are to catch up to their more privileged peers. In this respect, the results of my dissertation may have important implications for educational change and future research.



## Chapter 1

### Introduction

Extensive research indicates the importance of early reading ability. A large body of work suggests that early ability in this area predicts future success in reading. For example, Juel (1988) found that children who entered kindergarten as poor readers had an 88% chance of still struggling with reading in the 4<sup>th</sup> grade. Similarly, significant positive effects of first-grade reading ability on vocabulary, reading comprehension, and general knowledge have been found in 11<sup>th</sup> grade, confirming the pervasive power of early reading skills (Cunningham & Stanovich, 1997). The predictive relationship between early reading ability and later achievement in reading, as well as in subjects like math and science, has since been repeatedly substantiated (DeBaryshe & Gorecki, 2007; Duncan et al., 2007; Herbers et al., 2012; O'Reilly & McNamara, 2007; Torgesen, Rashotte, & Alexander, 2001).

But although reading is first featured as a learning goal in the first years of schooling, it actually starts to develop in the early childhood years through the development of language and early literacy skills. In particular, a growing research base has established the importance of vocabulary knowledge, phonological awareness, oral comprehension ability, print awareness, and alphabetic knowledge to children's ability to decode and comprehend written text. Of these, the relationship between early vocabulary knowledge and later reading ability, especially in reading comprehension, has been particularly well studied (Chall, Jacobs, & Baldwin, 1990; Kieffer & Lesaux, 2007; Tannenbaum, Torgesen, & Wagner, 2006; Walker, Greenwood, Hart, &

Carta, 1994; Yovanoff, Duesbery, Alonzo, & Tindal, 2005). The predictive role of phonological awareness has also been much examined (e.g., Bus & van IJzendoorn, 1999; Kirby, Parrila, & Pfeiffer, 2003). Other experts have established the importance of oral language comprehension for understanding texts, particularly as the level of difficulty of increases (Stanovich, Cunningham, & Feeman, 1984; Storch & Whitehurst, 2002; Verhoeven & van Leeuwe, 2008). Finally, print awareness (e.g., Cunningham & Stanovich, 1991, 1997; McBride-Chang, Manis, Seidenberg, Custodio, & Doi, 1993; Stanovich & Cunningham, 1992) and alphabet knowledge (e.g., Muter, Hulme, Snowling, & Taylor, 1998; Parrila, Kirby, & McQuarrie, 2004) have been shown to predict reading ability. In short, the language and early literacy skills that pave the way for successful reading are reasonably well understood.

Unfortunately, however, children in the United States arrive in kindergarten with disparate language and early literacy skills that vary along socioeconomic lines. Evidence about these differences is especially abundant in the area of vocabulary knowledge. For example, Hart and Risley's influential work on early vocabulary learning in low- and middle-income families reveals striking differences between these groups in both the interactions that foster vocabulary development and children's resulting vocabulary growth rates (Hart & Risley, 1995; Hart & Risley, 1999). The consequence of these, the authors suggest, is an exposure gap of 30 million words over the first three years of children's lives (Hart & Risley, 2003). A large body of work supports these findings, suggesting that differences in vocabulary knowledge between children from socioeconomically disadvantaged homes and their peers are largely due to differences in quantity and quality of exposure to words at home (e.g., Biemiller, 2005; Fernald, Marchman, & Weisleder, 2013; Hoff, 2003; Snow, Burns, & Griffin, 1998). Research has also revealed differences across socioeconomic groups in oral language comprehension, phonological

awareness, alphabet knowledge, and print awareness (e.g., Molfese et al., 2006; Nelson, Welsh, Vance Trup, & Greenberg, 2011; Smith & Dixon, 1995; Walker et al., 1994). Given this evidence, it is unsurprising that early reading ability itself has also been found to vary with socioeconomic status (e.g., Dubow & Ippolito, 1994; Hecht & Greenfield, 2002; Walker et al., 1994). This troublesome situation is made all the worse when one considers work by Stanovich in which he suggests that children who arrive in school less able to read will continue to fall ever further behind due to the “bootstrapping” effect that reading ability has on cognition (Stanovich, 1986). His findings underscore the seriousness of the early literacy gap for socioeconomically disadvantaged children and the urgent need for early intervention in this area.

Indeed, knowledge of the importance of language and early literacy skills and the existence of these socioeconomic differences has led to the development of interventions to foster such skills in children at-risk for academic difficulties. Many of these have been successful. For example, the Abecedarian Project provided preschool education for high-risk children, as well as supplementary education in the elementary grades. Among other things, the results of this experimental study suggest that participation in the preschool program increased children’s reading ability, a trend that persisted through age 21 (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Research by Lonigan and colleagues focused more specifically on literacy development. In this study, children in treatment classrooms using a literacy-focused preschool curriculum performed significantly higher on language and literacy measures including expressive language, blending, elision, print knowledge, and rapid letter naming (Lonigan, Farver, Phillips, & Clancy-Menchetti, 2011). Similarly, a study by Neuman and colleagues examined the effects of a curriculum designed to teach word knowledge and conceptual development through taxonomic categorization. Results of their experimental study

indicated that the Head Start children receiving the supplementary curriculum made significant gains in both vocabulary and categorical knowledge over children in control classrooms. Moreover, these gains remained six months later (Neuman, Newman, & Dwyer, 2011). Based on the encouraging results of studies like these, state- and federally-funded programs have been created with the goal of increasing the language and literacy skills of at-risk children. At the federal level, Head Start promotes school readiness, especially in language and early literacy development, through education, and health and social services ("Head Start Act, 42 U.S.C. §9801.," 1992). At the state level, all but ten states offer similar subsidized programs to economically disadvantaged children.

Despite the admirable goals of state and federal preschool programs, there is a paucity of knowledge about the actual day to day opportunities – what is referred to as the “enacted curriculum” (Porter, 2002) – for language and early literacy development provided to at-risk preschoolers in such programs. Extant studies of the enacted literacy curriculum often scrutinize specific lessons, but leave the rest of the day unexamined (e.g., Justice, Mashburn, Hamre, & Pianta, 2008). Those that do examine the full day enacted literacy instruction suffer from a number of problems, including the failure to sufficiently sample at-risk children (e.g., Connor, Morrison, & Slominski, 2006) and the placement of focus on kindergarteners who have already experienced their most formative early childhood years (e.g., Paro et al., 2009). An additional problem with the existing research body is that few studies dig deeply into the enacted language and literacy instruction provided to preschoolers. For example, we have an insufficient understanding of the literacy topics and skills that teachers focus on, as well as the instructional strategies that they use when they teach in these areas.

Moreover, little research on enacted language and literacy instruction has included the instantiated curriculum in domains like science, a gap in the research that must be addressed. Studies indicate that language and literacy instruction and learning do not merely take place during times dedicated to instruction in these areas. This is particularly true during the early childhood years, when curricula that integrate children's learning within and across domains and disciplines and that feature contextualized and play-based learning are championed as developmentally appropriate (Copple & Bredekamp, 2009). Thus, much language and literacy instruction and learning occurs more centrally, embedded across domains and throughout the classroom. A significant body of research suggests that this is the case. For example, research suggests that guided play promotes oral language development (Dickinson & Tabors, 2001; Sawyer & DeZutter, 2007; Stone & Christie, 1996), and that literacy-enriched play settings (Neuman & Roskos, 1992; Vukelich, 1994) and print-rich environments (Guo, Justice, Kaderavek, & McGinty, 2012; N. E. Taylor, Blum, & Logsdon, 1986) promote literacy behaviors and learning throughout the preschool classroom.

Interactions and instructional strategies that foster language and literacy learning are particularly likely to occur during science instruction and exploration. Science promotes the use of descriptive language, as children engage in exploration, discussing the properties of objects and verbalizing questions. For example, preschool science experiments support vocabulary development by exposing children to a variety of sophisticated new words in meaningful contexts. Preschool science instruction also provides opportunities for children to use comparative language as they make observations or compare and classify natural objects. Much research supports this, indicating that language and discussion are central to science learning (Conezio & French, 2002; Mercer, Dawes, Wegerif, & Sams, 2004; Worth, Moriarty, &

Winokur, 2004). Furthermore, evidence for language and literacy learning during science instruction has been found. For example, a study by French (2004), examined a curriculum developed to foster problem solving, self-regulation, language development, and pre-literacy skills through the presentation of science content. Among other results, French reports significant gains in receptive vocabulary in children who experienced the curriculum. Similar work by Peterson and French (2008) found correlations between science instruction and the quantity and quality of children's explanatory language. A study by Gelman and colleagues linked instruction in science with children's comprehension and discussion of scientific concepts (Gelman, Brenneman, Macdonald, & Román, 2009), while an empirical study of a supplementary integrated science curriculum by Greenfield et al. (2009) revealed significant differences in eight school readiness domains, including language development and literacy. Other research suggests that science and literacy skills are mutually supportive. Work by Gelman and Brenneman (2004) indicates that preschool children's science content knowledge and their developing language skills mutually reinforce each other. In fact, this relationship appears to continue as children progress through elementary, middle, and high school (Pearson, Moje, & Greenleaf, 2010). In sum, there is clear evidence that preschool language and literacy interactions and instruction are often embedded with content domains – and within science in particular –and that science learning and language and early literacy development are intrinsically linked.

However, despite these findings and the example provided by research in which social studies lessons were included in an examination of elementary school comprehension instruction (Durkin, 1978-1979), research on preschool language and literacy instruction typically ignores time spent on science. There is a clear and urgent need for more research in this area. The purpose of this dissertation study is to begin to address this research gap, providing a deeper

understanding of the instruction provided to at-risk children in areas that especially foster their language and early literacy development. In particular, the following research questions are addressed in this study:

1. How much time do preschool teachers devote to literacy instruction with at-risk children?
2. Which literacy skills are most commonly taught in preschools targeting at-risk children?
3. To what extent do teachers focus on key literacy skills and related instructional strategies in preschools targeting at-risk children?
4. Within a content domain like science, what instructional strategies that are related to language and literacy development do teachers employ, and which are most commonly used?

### **Overview of the Present Study**

If we are to improve the language and literacy skills of at-risk children and achieve the goal of educational equity, it is vital that we understand the relevant instruction actually provided to them in daily practice. Therefore, the purpose of this dissertation is to begin to address the gap in research about the day to day enacted instruction teachers provide to increase at-risk preschoolers' language and early literacy development. My primary goal is to examine the enacted literacy instruction and, because instruction in this content area typically relies on strategies that promote language development, aspects of the enacted science instruction occurring in a naturalistic preschool setting. The data for this study were collected as part of a larger study on the World of Words curriculum (Susan Neuman, PI). Funding for this project, itself a part of the larger Ready to Read research program, was provided by a grant from the Institute of Education Sciences.

In order to study the enactment of language and literacy instruction in sampled preschools, this dissertation uses an innovative technique first designed by Rowan, Camburn, and Correnti (2004). These authors identified challenges in measuring the enacted curriculum, and set out to design a cost-effective method that moved beyond identifications of the overlap between what is taught and what is tested. They also sought to identify an analytic strategy to reveal patterns in how content coverage is distributed across lessons, students and classrooms. Their efforts led to the development of a teacher instructional diary, or log, to measure the enacted reading and language arts instruction in early elementary school. This log asked teachers to report on the reading and language arts instruction received by a focal student that day. In particular, teachers were asked to estimate the time that the focal child experienced instruction in these areas, the extent to which they experienced focused instruction in related topics (e.g., comprehension, writing, and word analysis), the areas that teachers focused on *within* those topics, the materials used by the students, and the instructional strategies employed by the teacher.

Using their log, Rowan and colleagues were able to efficiently gather a great deal of detailed data on the enacted curriculum and teacher practice provided by 150 teachers in high-poverty schools to their third grade students. The authors then used hierarchical linear modeling (HLM) procedures to model variation in curriculum enactment occurring across occasions, students, and teachers, accounting for the nested nature of the data. Based on their work, Rowan and colleagues champion both their log and, when multi-level comparisons of curriculum distribution are being made, HLM as an appropriate analytic strategy. Their log was later supported by additional studies confirming this methodology as a way to examine enacted curriculum (Rowan & Correnti, 2009), as well as a validity study in which log data were found



to be far more cost effective and only very slightly less reliable than observational data (Camburn & Barnes, 2004). The authors conclude with an open invitation to scholars to use instructional logs to examine enacted instruction.

My dissertation takes up this invitation. This project was designed to use innovative log methodology to provide a detailed examination of the enacted practice in 14 classrooms in the domain of language and literacy, as well as the instructional strategies related to language and literacy development employed in the domain of science. The format and content of the teacher log used in this dissertation were very closely based on the work of Rowan and colleagues, although it was, of course, altered to capture aspects of the curriculum that are theoretically relevant to preschool language and early literacy instruction. And like the instructional log developed by Rowan et al., the log used in this dissertation project asks teachers to report on the enacted curriculum received by a single focal student on a single day, based on the fact that, after the collection of about 14 logs, mean responses accurately reflect the average instruction experienced by *the average child* in a teacher's classroom (Rowan et al., 2004, p. 81).

### **Methods and Analysis**

In this dissertation, I examine the enacted language and literacy instruction provided to 220 at-risk preschoolers in the greater Detroit, Michigan area. Data were collected via a daily teacher log over the course of five weeks during the spring of 2012. Participants were fourteen preschool teachers leading fourteen state-funded Great Start Readiness Program (GSRP) preschools. Teachers were asked to recall and report on the instruction provided to a focal child, whose name they received via email at the close of the school day. To provide a deeper understanding of the instruction that promotes language and early literacy development enacted in sampled classrooms, teachers were asked to reflect on both the language and literacy instruction and aspects of the science instruction experienced by the focal child. They reported

the total estimated time spent on instruction in language and literacy, as well as the extent to which that child was provided with instruction in key early literacy skills (vocabulary, oral language comprehension, print awareness, and letters and sounds). Teachers then reported on their use of instructional strategies during language and literacy instruction, as well as their use of key instructional strategies related to language and literacy development during science instruction.

Using these detailed data, I present descriptive findings on the enacted language and literacy instruction and, in order to partially account for language development instruction embedded in content areas, aspects of the enacted science instruction provided by participating GSRP preschool teachers. I aggregate responses to the teacher level, reporting the average number of minutes of language and literacy instruction provided by teachers to the average at-risk preschooler in their classroom. I also characterize the basic nature of instruction in these areas provided to at-risk children by participating teachers. I examine the data on vocabulary, oral language comprehension, print awareness, and letters and sounds instruction, as well as teachers' reported use of relevant strategies during their instruction in these areas. Finally, I report on their use of instructional strategies related to language and literacy development during science instruction.

### **Contribution of the Study**

Although the language and early literacy skills that predict reading ability are quite well understood (Strickland & Shanahan, 2004), we do not have a good understanding of the opportunities for development in these areas that are actually provided in preschools. Much of the current research base on enacted literacy instruction focuses on elementary school children, passing over the key early childhood years (e.g., Pianta, Belsky, Houts, & Morrison, 2007;

Rowan et al., 2004; Rowan & Correnti, 2009; Tobin & McInnes, 2008; Wright, 2011). Research targeting children at academic risk is also lacking, which is problematic given the particular need that students from economically disadvantaged backgrounds have for language development (Dickinson, McCabe, & Essex, 2006; Hart & Risley, 1995; Hoff, 2013; Stanovich, 1986). Finally, extant studies typically fail to consider that great opportunities for language development occur during language-rich instruction in domains like science. This is despite indications that language and literacy interactions and instruction often occur embedded in other content areas (e.g., Durkin, 1978-1979), a body of research linking science content instruction with rich language use (e.g., Conezio & French, 2002; Gelman & Brenneman, 2004; Worth et al., 2004), and studies strongly suggesting that science instruction improves language and literacy outcomes for preschoolers (e.g., French, 2004; Gelman & Brenneman, 2004; Peterson & French, 2008). The present study addresses these gaps in the research base, providing a deeper understanding of the enacted literacy and science instruction delivered by a group of preschool teachers to their at-risk students.

Research in this area is currently particularly germane. A clearer understanding of the language and literacy instruction actually provided to economically disadvantaged children in targeted preschools is needed to inform recent policy debates in states facing budget cuts that threaten the effectiveness, and potentially, the very existence of such programs. In Michigan, for example, debate about the funding of GSRP preschools is ongoing (Dwyer, 2013, March 6; Michigan League for Public Policy, 2014). Ironically, however, although the GSRP was designed to reduce the achievement gap in language and literacy (Michigan Department of Education, n.d.), current debates rely merely on the knowledge that early intervention efforts *can* improve language and literacy development in economically disadvantaged children, on the fact

that the GSRP legislation calls for much instruction in these areas area (Michigan Department of Education, n.d.), and on the *presumption* that GSRP children are experiencing a great deal of instruction in language and literacy skill development. Research addressing this knowledge gap is absolutely essential to inform discussions about the program's effectiveness and debate about its future. In addition, this dissertation study is particularly relevant because it includes an examination of the enacted science instruction; the inclusion of this domain aligns with the ever-increasing integration of Science, Technology, Engineering and Math (STEM) education into comprehensive high-quality early childhood curricula (Brenneman, Stevenson-Boyd, & Frede, 2009) and the recent trend toward state science preschool learning expectations aligned with new kindergarten Common Core standards (Common Core State Standards Initiative, 2010).

Language development and early literacy skills are particularly vital to economically disadvantaged children's success. Therefore, a comprehensive understanding of the day to day opportunities for learning in these areas currently provided to economically disadvantaged children is vital. Such information will greatly inform efforts to improve instruction in targeted preschool programs, thereby closing the language and literacy achievement gap and advancing us closer toward the goal of educational equity.

## Chapter 2

### Literature Review

Reading ability has enormously pervasive and enduring effects on children's academic and social prospects. Much research indicates that early reading ability predicts later reading achievement. An influential study by Juel (1988) indicated that the vast majority (88%) of poor readers in kindergarten are almost always still struggling in 4<sup>th</sup> grade. The predictive relationship between early reading ability and reading achievement over the course of a child's schooling has since been repeatedly demonstrated (Herbers et al., 2012; Hernandez, 2011; Sénéchal & LeFevre, 2002; Stainthorp & Hughes, 2004; Wagner, Torgesen, Rashotte, & Hecht, 1997). In fact, significant positive effects of first-grade reading ability on reading comprehension, vocabulary, and general knowledge have been found in 11<sup>th</sup> grade, indicating the pervasive power of rapid reading acquisition (Cunningham & Stanovich, 1997).

Unfortunately, studies also suggest that children who begin school with less well-developed reading skills may fall further and further behind in school over time, gradually increasing the achievement gap between them and their more proficient peers. Key research by Stanovich (1986) suggests a reciprocal relationship between reading and cognitive efficiency that may well explain how reading ability bootstraps achievement across school subjects. Stanovich contends that large areas of knowledge are prevented from developing when reading levels remain low, and that this problem is then exacerbated as a student's reliance on the interpretation and understanding of written text across content areas increases. Thus, the cognitive, motivational,

and behavioral fall-out from the negative feedback loop of slow reading acquisition may impact cognitive ability into adulthood (Stanovich, 1986; West, Stanovich, & Mitchell, 1993). Scholars have since sought to corroborate and refine this theory. Although the Matthew Effect has been repeatedly confirmed (Pfof, Dörfler, & Artelt, 2012; Stanovich, 2000; Walberg & Tsai, 1983), other work has called Stanovich's findings into question. In fact, some encouraging results suggest that low-scoring readers may be able to slightly close the reading gap over time (e.g., Aarnoutse, Van Leeuwe, Voeten, & Oud, 2001; Huang, Moon, & Boren, 2014). However, a recent review of extant research by Pfof and colleagues suggests that although Matthew Effects may not be apparent when reading scores are examined, they often emerge when skills that strongly *predict* reading, such as decoding efficiency and vocabulary, are examined. They also found evidence of Matthew Effects for composite reading scores (Pfof, Hattie, Dörfler, & Artelt, 2013). Moreover, evidence supports Stanovich's assertion that the widening of the reading gap over time is due to the reciprocal and causal relationship between reading behavior and reading competence (Anderson, Wilson, & Fielding, 1998; Cipielewski & Stanovich, 1992; McElvany, Kortenbruck, & Becker, 2008; Pfof, Dörfler, & Artelt, 2010).

Scholars continue to explore the exact nature of the relationship between early reading ability and reading competence over time. Nevertheless, extant research has already clearly established the importance of early reading ability to children's success. Moreover, studies suggest that early reading ability does not only predict how well children will perform in reading throughout their schooling. Rather, early reading ability also impacts achievement across school subjects like math and science (e.g., Duncan et al., 2007; Herbers et al., 2012; O'Reilly & McNamara, 2007). Differences in high school achievement then affect students' lives beyond their time in the K-12 school system via performance on key standardized tests, college

admission rates, and life-long employment opportunities. Clearly, reading is an extremely essential and important skill.

### **Key Language and Early Literacy Skills that Predict Reading**

But although reading is first formally featured as a learning goal in elementary school, the ability to read begins in the early childhood years through the ongoing development of fundamental language and early literacy skills that facilitate a child's ability to make sense of written text. In fact, understood from an "emergent literacy" perspective, these skills do not merely enable future reading; they are themselves integral parts of a literacy development process that begins at birth (Sulzby & Teale, 1988; Teale & Sulzby, 1986; Whitehurst & Lonigan, 2003). In particular, a convergence of research investigating children's early literacy development indicates the importance of ability in five interrelated areas: vocabulary, oral language comprehension, phonological awareness, print awareness, and alphabetic knowledge (see Pinkham & Neuman, 2012; Strickland & Shanahan, 2004).

For example, much research indicates that early vocabulary knowledge is integral to a child's future success in reading, particularly through the role it plays in facilitating reading comprehension. Extant research confirms that early vocabulary knowledge predicts reading comprehension in the elementary grades (Chall et al., 1990; Hart & Risley, 1995; Walker et al., 1994), in middle elementary school (Scarborough, 1998a; Sénéchal, Ouellette, & Rodney, 2006; Storch & Whitehurst, 2002), and even through eighth grade (Yovanoff et al., 2005). The National Early Literacy Panel (NELP), in their report on developing early literacy, includes vocabulary in two composite early literacy skills ("reading readiness" and "oral language") found to be moderately correlated with later literacy achievement (National Early Literacy Panel, 2009). In fact, some evidence exists that supports a *causal* connection between children's

vocabulary knowledge and their reading comprehension (Kieffer & Lesaux, 2007; Snowling & Hulme, 2011; Tannenbaum et al., 2006). Additionally, vocabulary knowledge has been linked to key language and early literacy skills such as the development of phonological awareness (e.g., Goswami, 2002; Metsala & Walley, 1998) the decoding of novel words (see Ehri & Nunes, 2002; Ouellette, 2006), and oral language comprehension needed to understand decoded text (Anderson & Freebody, 1981; Beck & McKeown, 2007). Clearly, vocabulary knowledge plays an important role in children's developing ability to read.

Evidence also confirms the importance of oral language comprehension to reading. A body of research indicates that children's early receptive language ability, whether measured by "oral language comprehension" generally or by one or more of its composite skills (e.g., semantics, syntax, or pragmatics), predicts their reading comprehension, particularly as text difficulty increases (e.g., Juel, 1988; National Early Literacy Panel, 2009; Olofsson & Niedersøe, 1999; Roth, Speece, & Cooper, 2002; Spira, Bracken, & Fischel, 2005; Stanovich et al., 1984; Storch & Whitehurst, 2002; Verhoeven & van Leeuwe, 2008; Yovanoff et al., 2005). Several important studies have extended research in this area yet further, seeking to more precisely define the role that oral language comprehension and its composite skills play in reading. For example, Scarborough (1990) linked young children's syntactic complexity to their vocabulary ability at age 3, to their object-naming, phonemic awareness, and letter-sound knowledge in kindergarten, and finally to their reading ability in second grade. Taking a different approach, Wise and colleagues used structural equation modeling to reveal proposed causal relationships between a number of oral language skills and reading comprehension. They suggested that listening comprehension primarily facilitates word identification ability, thereby increasing reading comprehension achievement (Wise, Sevcik, Morris, Lovett, & Wolf, 2007). Studies like



these continue to refine our understanding of the already established relationship between oral language comprehension and reading.

A great deal of reading research has also examined the predictive role that phonological awareness plays. Broadly defined, phonological awareness is the ability to detect, manipulate, or analyze the sounds of spoken language (National Early Literacy Panel, 2009). This ability has been found to predict reading ability in studies employing both concurrent and predictive correlations (see Adams, 1990; Brady & Shankweiler, 1991; Kirby et al., 2003), as well as a key meta-analysis by Bus and van IJzendoorn (1999). In fact, the National Early Literacy Panel's report suggests that phonological awareness more strongly predicts measures of literacy development than does either vocabulary knowledge or oral language comprehension (National Early Literacy Panel, 2009). A body of research also exists suggesting that phonological awareness plays a *causal* role in learning to read (Hulme, Bowyer-Crane, Carroll, Duff, & Snowling, 2012; Melby-Lervåg, Lyster, & Hulme, 2012; Wagner & Torgesen, 1987; Wagner et al., 1997) that may involve a relationship of reciprocal causation between phonological processing and both decoding and letter-name knowledge (McGuinness, McGuinness, & Donohue, 1995; Wagner, Torgesen, & Rashotte, 1994). But, like oral language comprehension, phonological awareness is actually comprised of a number of interrelated skills, including, rhyming ability, segmentation ability, and phonemic awareness (the ability to perceive, identify and manipulate the smallest meaningful units of sound). The relationships between each of these phonological awareness skills and reading achievement have also been widely studied, although exactly how these relationships function and the extent to which each specific skill predicts reading is still debated. For example, much work suggests that sensitivity to rhyme fosters awareness of phonemes, which then aids in the development of reading (Bryant, MacLean,

Bradley, & Crossland, 1990; Hayes, 2001; Justice, Kaderavek, Bowles, & Grimm, 2005; Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000). Other research indicates that segmentation and awareness of syllable structure predict reading ability (Mann & Liberman, 1984; Nation & Hulme, 1997), and may actually be more strongly and possibly causally correlated with reading achievement than rhyming (Muter et al., 1998; Yeh, 2004; Yeh & Connell, 2008) – although these findings have been the source of some debate (Badian, 2000; Bryant, 1998; Felton, 1992). Phonemic awareness, itself a complex skill, has also been found to predict reading ability through at least fifth grade (e.g., Allor, 2002; Hulme et al., 2002; Lundberg, Olofsson, & Wall, 1980; Perfetti, Beck, Bell, & Hughes, 1988; Torgesen, Wagner, Rashotte, Burgess, & Hecht, 1997), although research suggests that this relationship may fade by second grade for both typical learners and those with reading disabilities (Scarborough, 1998b). Taken together, this diverse and extensive body of research on phonological awareness indicates two things: that facility with the sounds of spoken words predicts reading ability, and that more research is needed to resolve debate about the relationships between the skills that comprise phonological awareness and reading achievement.

Print awareness, a child's knowledge of the conventions of printed language, also facilitates and predicts reading. Two aspects of print awareness have been widely studied: print concepts and print exposure. Research indicates that children's awareness of the purpose of print, as well as its conventional forms and functions (e.g., the concept of a word or print directionality), supports future reading success (Clay, 1993). Scores on concepts of print assessments in preschool have repeatedly been found to predict later reading ability, especially reading comprehension (Badian, 2000, 2001). Similarly, recent work by Justice and colleagues indicates that preschool teachers' explicit text referencing during book reading has a causal

effect children's literacy ability (Piasta, Justice, McGinty, & Kaderavek, 2012). Further confirming the importance of print concepts for reading, the NELP report categorizes both knowledge of print conventions and concepts and "print knowledge" (a combination of elements of alphabet knowledge, concepts about print, and early decoding), as moderately correlated with later literacy outcomes (National Early Literacy Panel, 2009). Unsurprisingly, given the role that knowledge of print concepts play in reading, much research also suggests that print *exposure* predicts reading ability. Stanovich and Cunningham are major contributors in this area, using check-lists-with-foils to suggest that print exposure (a) independently contributes to vocabulary development, which children need for reading comprehension (Cunningham & Stanovich, 1991; Stanovich & Cunningham, 1992); (b) predicts orthographic processing skills in adults, which influences reading ability; and (c) predicts reading comprehension scores through 11<sup>th</sup> grade (Cunningham & Stanovich, 1997; Stanovich & West, 1989). Though Stanovich's work has met with both opposition (Kail, Hall, & Caskey, 1999; Stanovich & West, 1994; D. Taylor, 1994) and support (McBride-Chang et al., 1993), the idea that print exposure predicts reading ability is widely accepted.

Finally, alphabet knowledge has been found to predict reading ability. Work spanning decades suggests that knowledge of letter names assists children in making connections between strings of printed letters and the words they represent. For example, in her seminal work Chall (1967) found that early letter name knowledge strongly predicts early reading achievement, a conclusion concurrently supported by Bond and Dykstra (1967). Later findings confirmed the predictive power of letter name knowledge to early reading ability (Caravolas, Hulme, & Snowling, 2001; Catts, Fey, Zhang, & Tomblin, 2001; McBride-Chang, 1999; Muter et al., 1998; Parrila et al., 2004; Pennington & Lefly, 2001), and to decoding specifically (Lonigan, Burgess,

& Anthony, 2000). A large body of work also indicates that knowledge of letter-sound correspondance (which promotes phonological processing) predicts reading achievement (Foorman, Francis, Novy, & Liberman, 1991; Howes et al., 2008) because of the important role it plays in word recognition (Morris, Bloodgood, Lomax, & Perney, 2003; Storch & Whitehurst, 2002; Treiman, Tincoff, Rodriguez, Mouzaki, & Francis, 1998). Moreover, research suggests that the relationships between letter name and letter sound correspondance and reading achievement are causal (Hulme et al., 2012; Lonigan et al., 2000). Children's ability to rapidly name letters is a related skill also found to be closely associated with reading achievement (Cronin & Carver, 1998; Hecht, Burgess, Torgesen, Wagner, & Rashotte, 2000; Walsh, Price, & Gillingham, 1988). Confirming this body of research, the NELP included "alphabet knowledge" among skills that strongly predicted later measures of literacy development (National Early Literacy Panel, 2009). In fact, in their oft-cited synthesis of extant research on early reading development, Snow, Burns and Griffin (1998) deemed children's knowledge of the alphabet to be one of the best predictors of learning how to read. Although alphabet knowledge alone is clearly insufficient as a facilitator of reading ability, its importance is widely agreed upon (see also Foulon, 2005).

Detailed discussion of the research on the importance of these five key early literacy skills to reading and the ways in which they influence each other (e.g., Ouellette & Haley, 2013) could – and has – filled large volumes. Yet even a cursory discussion of extant literature clearly demonstrates that these five skills are moderate to strong independent and possibly causal predictors of how quickly and how well young children will learn to read once they receive formal reading instruction in elementary school. In short, this abundant body of research clearly shows the importance of early literacy skills to children's future success.

## **Socioeconomic Differences in Language and Early Literacy Skills and Reading Ability**

A convergence of evidence confirms that vocabulary knowledge, oral language comprehension, phonological awareness, print awareness, and alphabetic knowledge predict early reading ability. Early reading ability then significantly predicts both children's future reading achievement and, thereby, their academic achievement more generally. Together, then, these relationships hold great promise for young children exposed to ample appropriate language and literacy interactions and instruction.

However, the predictive relationship between language and early literacy skills and future reading achievement is problematic for children who are not given sufficient opportunity to develop these skills. Such children will very likely be slower to develop the abilities needed to make sense of written text. They are then likely to fall behind their peers academically, facing less bright futures as a result. In fact, the problem is more sinister still. Lack of exposure does not result in poor early literacy skills in an indiscriminate group of children liable to become poor readers. Rather, access to literacy-enhancing interactions, experiences and tools (e.g., books, newspapers, and computers) differ markedly along socioeconomic (also referred to in the literature as "social class" or "social status") lines (e.g., Farkas & Beron, 2004; Heath, 1983; Neuman & Celano, 2001; Purcell-Gates, 1998; Raikes et al., 2006; Rowe, 2008). Thus, the predictive relationships between language and early literacy skills and future achievement herald the systematic failure of poor and minority children.

Much research confirms that children from low socioeconomic backgrounds enter schooling with fewer of the key language and early literacy skills required for successful reading than do their more privileged peers. In particular, a preponderance of evidence indicates the existence of socioeconomic differences in early vocabulary knowledge. These differences have

been found in children as young as 18 months old (Fernald et al., 2013), in older toddlers and preschoolers, (Hart & Risley, 1995; Hoff, 2003), as well in kindergarteners (Biemiller, 2005; Dickinson & Snow, 1987). By one estimate, first graders from high socioeconomic backgrounds may know an average of twice as many words as their lower-income classmates (White, Graves, & Slater, 1990).

Researchers seeking to discover the root of these socioeconomic differences in vocabulary knowledge have frequently argued that the vocabulary gap is due in great part to disparities in early exposure to language. For example, studies suggest that, on average, children from low-income families hear far fewer spoken words than do their wealthier peers (Hart & Risley, 1995; Snow et al., 1998). Moreover, scholars have used statistical models to reveal links first between caregiver socioeconomic status (SES) and caregiver vocabulary knowledge and use, and then between caregiver child-directed vocabulary and children's expressive and receptive vocabulary ability (Bornstein, Haynes, & Painter, 1998; Hoff, 2003; Hoff & Tian, 2005). Several studies have attempted to identify the underlying mechanisms by which differences in child-directed vocabulary influence vocabulary knowledge. For instance, it has been proposed that differences in environment or opportunity may cause children from low socioeconomic backgrounds to develop decreased phonological capacities, which are needed to support vocabulary development (Gathercole, Hitch, Service, & Martin, 1997). A study by Hurtado and colleagues strongly suggests that differences in maternal language input affect children's lexical processing efficiency. The result, they argue, are differences in vocabulary growth trajectories and, ultimately, disparities in oral language comprehension and knowledge stores (Hurtado, Marchman, & Fernald, 2008). In contrast to this body of work, the results of a study by Pan, Rowe, Singer, and Snow (2005) suggest that differences in the *quality*, rather than

quantity, of caregiver child-directed speech input predicts child vocabulary knowledge. Others have noted that there is considerable variability in both the quantity and quality of child-directed speech among low-income families (e.g., DeTemple & Snow, 1996). But although research in this area continues, the evidence that children's vocabulary knowledge varies along socioeconomic lines is incontrovertible.

Unfortunately, research also indicates that children who begin formal schooling behind in vocabulary will have difficulty catching up to their peers. A large body of work shows that vocabulary gaps persist over time (Biemiller, 2001; Hart & Risley, 1995; Juel, Biancarosa, Coker, & Deffes, 2003; White et al., 1990). Attempting to quantify these differences, Biemiller (2005) suggests that average children know about 6,000 root words by the end of second grade, whereas those in the lowest quartile know only 4,000. He then calculated that children in the lowest quartile learn about 500 words a year in kindergarten, and emphasized the fact that closing the vocabulary gap would require vocabulary-disadvantaged children to somehow double that number, acquiring new words at an above-average rate. The gap in early vocabulary knowledge between socioeconomic groups is a serious problem indeed.

Unsurprisingly, given the extent to which vocabulary knowledge facilitates the understanding of spoken language, children from low socioeconomic backgrounds also tend to score lower on measures of oral language comprehension. For example, building on evidence that economically disadvantaged children are exposed to less diverse vocabulary at home and may be more likely to be prohibited from talking by their parents (Hart & Risley, 1989, 1992), research by Walker, Greenwood and Hart (1994) suggests that children's receptive language ability in kindergarten through third grade were predicted by their SES-related early language skills. Dickinson and Snow, in their study on a range of early language and literacy skills, found

significant differences in story comprehension between sampled kindergarteners categorized as being from low- and middle-class backgrounds (Dickinson & Snow, 1987). Extending the influence of socioeconomic status on oral language comprehension across countries and language groups, Acat and colleagues found a significant correlation between children's SES and their oral comprehension scores in 5<sup>th</sup> grade in a study examining the listening comprehension development of Turkish students. (Acat, Demiral, & Kaya, 2014). Attempting to shed light on the mechanisms that result in these differences in language comprehension, Fernald and colleagues tested infants' vocabulary knowledge and language processing speed using "looking-while-listening" tasks. Their results suggest that socioeconomic differences in oral language comprehension may be traced back to disparities in language processing speed that can be seen in children as young as 18 months old (Fernald et al., 2013). These differences in processing efficiency have been linked to scores on standardized tests of language and cognitive skills in elementary school (Marchman & Fernald, 2008), indicating the longitudinal impact of disparities in language comprehension between children from different SES backgrounds.

Socioeconomic differences have also been found in examinations of children's developing phonological and phonemic awareness. For instance, Nelson and colleagues published research on 336 Head Start preschoolers that highlights the delayed language and early literacy skills of children living in poverty. The majority of participants living in poverty demonstrated "significant" language delays. Nelson and colleagues found that the more severe the child's language delay, the worse that child scored on measures of phonological awareness (Nelson et al., 2011). This work builds on a body of previous research linking socioeconomic status with phonological sensitivity (Hecht et al., 2000; Lonigan et al., 2000; Lonigan & Whitehurst, 1998), including work by Raz and Bryant (1990) and Bowey (1995) suggesting that



social/socioeconomic status differences in decoding and reading comprehension can be completely and partially accounted for by children's general intelligence and phonological awareness, respectively. Studies examining children's *phonemic* awareness reveal similar influences of socioeconomic status (Adams, 1990; Dickinson & Snow, 1987; Korat, 2005).

A body of research also suggests that children's social class/socioeconomic backgrounds are significantly correlated with both their print awareness (e.g., Chaney, 1994; Lonigan et al., 1999; Nelson et al., 2011) and their alphabet knowledge (Clement, Reynolds, & Hickey, 2004; Lonigan et al., 1999; Molfese et al., 2006). In fact, in their longitudinal examination of what they term "social class" differences in the growth of decoding and reading comprehension from kindergarten through fourth grade, Hecht and colleagues (Hecht et al., 2000) found that a composite measure of print knowledge comprised of print concepts, letter name knowledge, and letter sound knowledge explained the greatest amount of social class difference in decoding and comprehension skills as children developed from kindergarten to second, third, and fourth grade. Moreover, the role that "print knowledge" played in explaining social class differences in children's developing language skills was greater than that of phonological awareness and their access of phonological information in their long-term memories. Along similar lines, Korat (2005) conducted research the results of which indicate the existence of two distinct two distinct groups of emergent literacy knowledge: contextual (consisting of environmental print, print functions, identifying literacy activities), and non-contextual knowledge (a combination of letter name knowledge, phonemic awareness and concepts of print). Korat sampled 70 Israeli kindergarteners from low- and middle-SES communities. Her results suggest that children from low SES backgrounds had poorer *non-contextual* knowledge, and that it was these non-

contextual measures – including alphabet knowledge and concepts of print – that predicted children’s word recognition and emergent writing ability.

Seeking to explain the existence of socioeconomic differences in early print awareness and alphabet knowledge, scholars have suggested that these disparities are rooted in differences in the home literacy environment, including exposure to print and shared book reading, across SES groups (Molfese et al., 2006; Smith & Dixon, 1995). This theory is further supported by evidence that only about half of low-income mothers read to their 1-3 year old children every day, and that these patterns predict language ability and cognition at 36 months (Raikes et al., 2006). Research will no doubt continue to reveal mechanisms through which children’s socioeconomic backgrounds influence their print and alphabet knowledge. Meanwhile, the fact that children from economically disadvantaged backgrounds are more likely to lag behind in these areas is widely accepted.

### **Resulting SES differences in reading.**

A preponderance of evidence confirms that these early literacy skills, so crucial for children’s literacy outcomes, tend to be less well developed in children from lower socioeconomic backgrounds. Given these trends it is unsurprising that reading achievement itself also varies heavily along SES lines (Dubow & Ippolito, 1994; Hecht & Greenfield, 2002; Herbers et al., 2012; Reardon, 2011; Smith & Dixon, 1995; Snow et al., 1998; Walker et al., 1994). Indeed, the 2011 National Assessment of Educational Progress (NAEP) data reveal that more than 40 percent of the variation in average reading scores is associated with variation in child poverty rates (Ladd, 2012). These SES-related gaps in reading achievement are both insidious and difficult to close. Once basic reading ability has been established, this skill continues to bootstrap cognition; research indicates that reading ability impacts performance in

disciplines such as math and science (DeBaryshe & Gorecki, 2007; O'Reilly & McNamara, 2007).

One probable explanation for the persistent and widespread impact of early differences in reading ability is the aforementioned “Matthew Effect.” Proponents note that children who grow up in environments that feature language experiences begin school with large vocabularies needed to facilitate reading comprehension. Because they are able to more quickly learn to read, they tend to read more, and are exposed to more print. This increased exposure results in new vocabulary knowledge, leading to better reading comprehension. In other words, research supporting the Matthew Effect indicates that there is a reciprocal relationship between reading ability and cognitive efficiency, and that the connection may be causal (Anderson et al., 1998; Cipielewski & Stanovich, 1992; McElvany et al., 2008; Pfoost et al., 2010; Pfoost et al., 2013; Stanovich, 1986, 2000; Walberg & Tsai, 1983). Thus, strong readers may become even more skilled over time, while weak readers fall ever further behind. Understood in this way, the early language and literacy skills gap predicts not only a future skills gap in literacy, but (at least partially) the achievement gap more generally. Indeed, the evidence that, on average, children from low-SES backgrounds fare less well academically than their peers is overwhelming (see also Lee & Burkam, 2002), with research by Sean Reardon suggesting that the achievement gap between children from high- and low-income backgrounds exceeds the gap that exists between white and black students (Reardon, 2011). Thus, the early literacy skills gap is a serious issue of “educational equity” of the sort addressed in the Elementary and Secondary Education Act, which champions the right to “a fair, equal and significant opportunity to obtain a high quality education” (Elementary and Secondary Education Act (ESEA), Pub.L. 89–10, 79 Stat. 27, 20 U.S.C. ch. 70).

## **Efforts to Improve the Literacy Skills of At-Risk Children**

The seriousness of the early language and literacy skills gap has resulted in the development of interventions to foster such skills in children at-risk for academic difficulties. Many of these attempts have been center-based. Center-based interventions are an efficient way to target at-risk children; in 2007, 41 percent of three- to six-year-olds in poor families, and 45 percent in low-income families attended center-based preschool programs (Federal Interagency Forum on Child and Family Statistics, 2012). Moreover, evidence indicates that both broad and literacy-specific center-based interventions can increase achievement in this area. For example, the Carolina Abecedarian Project provided preschool education for high-risk children, as well as supplementary education in the elementary grades. Participants in this program were randomly assigned to treatment and control groups at both the preschool and elementary levels. The authors found that gains in IQ scores and increased reading and math achievement persisted throughout young adulthood for children in the preschool program (Campbell et al., 2002). Literacy-specific preschool interventions have also been shown to be effective in boosting children's achievement. For example, an experimental study by Lonigan et al. examined the effects of a literacy curriculum. Their analysis suggests that children in treatment classrooms scored significantly higher on measures of expressive language, blending, elision, print knowledge, and rapid letter naming (Lonigan et al., 2011). Similarly, a curriculum designed to teach word knowledge and conceptual development through taxonomic categorization designed by Neuman, Newman, and Dwyer (2011) had encouraging effects on children's early literacy development. Specifically, the results of their experimental study indicate that the Head Start children in treatment classrooms made significant gains in vocabulary and categorical knowledge over children in control classrooms. Even more promising were results indicating that these gains

remained six months later. Additional studies echo these results (e.g., M. O. Gonzalez, Garcia Espinel, & Rosquete, 2002; Neuman & Dwyer, 2011), further demonstrating the power of early intervention in the area of language and early literacy development.

The success of intervention studies like these has also led to federal and state-funded programs designed to increase the school readiness of low-income children, thereby narrowing the achievement gap and advancing toward the goal of education equity. At the federal level, several education initiatives target at-risk preschoolers. Most notable among these is Head Start ("Head Start Act, 42 U.S.C. §9801.," 1992). Launched in 1965, this program promotes school readiness in preschoolers from low-income families through education, health, and social services. At the state level, state-financed preschool programs are offered for at-risk children in all states except Arizona, Hawaii, Idaho, Indiana, Mississippi, Montana, New Hampshire, North Dakota, South Dakota, and Wyoming. In fact, several states have recently gone further and offered state-wide universal preschool. The success of these programs in Georgia, Illinois, Florida, and Vermont – and particularly in Oklahoma (e.g., Gormley & Gayer, 2005; Gormley & Phillips, 2005), have influenced policies and the federal level, recently resulting in President Obama's proposed Preschool for All legislation.

Each of these federal and state programs was created to improve at-risk children's "school readiness". However, these programs greatly emphasize instruction in language and early literacy skills, due to the demonstrated importance of these skills for success across school subjects over time. Take, for example, Michigan's Great Start Readiness Program (GSRP), in which the data for this study were collected (State of Michigan, 96th Legislature, reg. sess., 2011). The GSRP provides free care and education for preschool-aged children deemed at educational risk but either not eligible for or unable to attend a federally-funded Head Start

program. Originally called the Michigan School Readiness Program (MSRP), the program began in 1985 and first served 694 children. In 2008, it was renamed the GSRP, and had grown substantially, serving 30,366 children. By 2012 the program served 32,139 at-risk children, providing them with part- or full-day care and education in center- and home-based programs (Michigan Department of Education, n.d.).

Evidence that the GSRP features language and literacy instruction can be found in key documents written to guide its implementation. The legislation itself (State of Michigan, 96th Legislature, reg. sess., 2011, p. 25) and the GSRP implementation manual (State of Michigan, 2011) remain rather general, including the stated goal of the program (“to ensure that every child in the community is ready for kindergarten”) and general curriculum and learning requirements. However, both documents refer to the Early Childhood Standards of Quality for Prekindergarten (ECSQ-PK; Michigan State Board of Education, 2005), which define detailed early learning expectations and quality program standards for Michigan preschoolers. Large portions of the ECSQ-PK focus on language and early literacy instruction, indicating the importance of teaching and learning in this domain to the GSRP’s mission of increasing kindergarten readiness in at-risk children. In particular, the literacy topics that teachers are expected to cover and the skills that children are expected to learn are carefully stipulated in three sections: learning expectations, program standards for curricula, and program standards for teaching practices. The language and early literacy learning expectations are many and detailed, indicating an emphasis in comparison to the other domains included in the ECSQ-PK. Specifically, they include eight subdomains: emergent reading, writing skills, expressive language, receptive language, viewing images or other media materials, positive attitudes about literacy, and diversity of communication. Each of these subdomains, in turn, is accompanied by a set of emerging indicators, with a total of 50

detailed indicators included in the domain of language and early literacy. In addition, many examples of activities, environmental features, and instructional strategies that foster the achievement of these emerging indicators are provided. The section devoted to program standards for curricula also indicates the importance of language and literacy instruction in the GSRP; a model curriculum is described as one in which “children have experiences to enhance their language and early literacy development, including listening and speaking skills and emergent skills in writing and reading and appropriate experiences with technology” (p. 111). Additionally, it is stressed that a quality program “uses learning experience in a variety of areas as an opportunity to enhance children’s language and early literacy development” (p. 111) and “develops skills (e.g., in literacy, math, physical development) in a meaningful context, and...makes connections” (p. 115). This language indicates the importance of embedded literacy instruction across content areas to the GSRP’s mission. Finally, the section in which program standards for teaching practices are detailed emphasizes model teaching practices related to language and early literacy instruction. Many of these are focused on the topics that ought to be covered or the materials that ought to be made available (e.g., books, hands-on materials). Others focus on the interactions between teachers and children (e.g., asking questions that elicit extended responses).

In sum, although no stipulations are made about the amount of instruction in literacy that children ought to receive (e.g., a minimum number of minutes of required instruction, or a desired proportion of time spent on certain topics), many clear requirements do exist about the language and early literacy skills that children are expected to master after attending a GSRP preschool, as well as the type of curriculum and instruction that supports the mastery of these skills. In fact, the parallel sections for other domains, such as science, also feature language and

literacy learning. For example, almost every emerging indicator listed for science contains literacy-related recommendations (e.g., that teachers engage children in conversation featuring new content vocabulary, encourage children to document their findings through writing, provide opportunities for rich discussion, or support their questioning and meaning-making). Both distinct and embedded language and early literacy instruction and learning are clearly a great focus of the GSRP.

### **The Enacted Curriculum**

Ironically, despite the importance placed on language and early literacy in programs like the GSRP, the day to day language and literacy instruction that actually occurs in such classrooms is relatively unknown. Rather, research has focused on a number of other aspects of preschool instruction. For example, many scholars have focused on the influence of the physical environment, resulting in a general consensus about the benefits of certain classroom elements. In particular, the benefits of physical literacy elements like environmental print and book access on early literacy development are well agreed upon (Morrow & Weinstein, 1982; Neuman, 1999; Neuman & Roskos, 1990, 1992, 1993; M. M. Neumann, Hood, Ford, & Neumann, 2011; M. M. Neumann, Hood, M., & Ford, R. M., 2013; Roskos & Neuman, 2001; N. E. Taylor et al., 1986). Much research has also examined the influence of curricula designed to improve domain-specific outcomes in preschool-age children. For example, initial evidence indicates that curricula can effectively improve the literacy skills of at-risk children (DeBaryshe & Gorecki, 2007; Lonigan et al., 2011; Neuman et al., 2011). When it comes to our knowledge of preschool domain-specific instruction, studies like these that focus on input (such as the use of a specific curriculum, or the “dose” of a particular intervention) and output (usually measured by child achievement) are typical (e.g., Beck & McKeown, 2007; French, 2004; Lonigan et al., 2011).



Other studies have examined the effect of teacher affect, language use, or teaching style on children's early skill development (e.g., Fuligni, Howes, Huang, Hong, & Lara-Cinisomoc, 2012; Hamre & Pianta, 2001; Hong & Diamond, 2012; Justice et al., 2008; Peterson & French, 2008; Pianta & Stuhlman, 2004), suggesting, for example, positive associations between the emotional and instructional climate of classrooms and children's early learning and socio-emotional development (e.g., Mashburn et al., 2008). Still others have looked at the impact of both the physical and psychological environments, with the understanding that the combination of an environment rich in domain-related materials and high-quality instruction and interactions may provide the best learning environment for young children (e.g., Christie & Enz, 1992; Neuman & Roskos, 1993; Tenenbaum, Rappolt-Schlichtmann, & Zanger, 2004). Recent work by Guo and colleagues furthered research in this area (Guo et al., 2012). Their examination of the physical and psychological literacy environments experienced by a group of at-risk preschoolers suggests that, although the physical environment alone has little impact on children's early literacy scores, the physical and psychological literacy dimensions are interdependent. The authors therefore stress the importance of instructional support during children's use of materials.

Furthered by innovative studies like that by Guo and colleagues, the above bodies of research have revealed much about the classroom elements that foster early learning in language and literacy. However, the *enacted* curriculum – the details of what children actually experience on a daily basis in preschool classrooms – is much less commonly researched. This is problematic, as initial evidence indicates that the specific implementation of curricula affects children's literacy outcomes (e.g., Guo et al., 2012). Indeed, Davidson, Fields, and Yang (2009) argue that fidelity of implementation needs to be carefully considered when assessing a

curriculum's value. Evidence about preschool literacy curricula suggest that although they tend to serve as frameworks for planned activities, specific instructional practices are followed less often (Pence, Justice, & Wiggins, 2008). For example, Justice and colleagues examined curriculum fidelity in preschools serving at-risk children and its interrelationships with quality of language and literacy instruction (Justice et al., 2008). The authors analyzed videotaped language and literacy lessons using the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2004), and subsequently ran correlations and regressions. Their work revealed that, although most teachers implemented the curriculum with high fidelity, few actually delivered high-quality instruction. For instance, most teachers followed the curriculum procedures, but few asked open-ended questions or modeled advanced vocabulary. In few cases, the authors explained, was literacy instruction provided that was explicit, systematic, and purposeful. While these findings have clear implications for teacher professional development, studies like these that are focused on specific lessons leave the rest of the day unexamined. Thus, the amount of time spent on literacy-related instruction is unknown, as activities such as book reading may fall outside of curriculum-specified lessons, or be embedded within seemingly unrelated areas, such as art, science, or even transition time.

Only a handful of studies have examined whole-day enacted literacy instruction in preschools serving at-risk children. A relevant study by Paro and colleagues compared the quality of learning opportunities provided in 730 kindergarten classrooms with previously collected observational data about preschool classrooms (Paro et al., 2009). Observations that focused on the nature and variety of activities provided in the classroom relied on the Child Engagement section of the Emerging Academics Snapshot (CE-EAS: Ritchie, Howes, Kraft-Sayre, & Weiser, 2002), and occurred for a half day once in the fall and once in the spring. CE-

EAS scores were then averaged along with scores on two other measures of classroom quality, resulting in one value of overall classroom quality for the year. Results of the CE-EAS indicate that preschool children, all of whom had attended state-funded programs, spent 43 minutes a day on literacy activities. This amounted to 14% of the average 5.1 hour preschool day. (In kindergartens, this proportion increased to 28%). The authors conclude that the majority of time is spent in non-learning time and transitions in preschool and kindergarten classrooms (Paro et al., 2009). However, their data analysis focused on kindergarten, with comparison to previously collected data on preschools added later in the process. Moreover, different observational methods were used during the data collection in preschools and kindergartens. Finally, Paro and colleagues do not examine the details of the literacy instruction (e.g., the topics covered or the instructional strategies used by teachers) provided to participating children.

Similar work was undertaken by Phillips Gormley, and Lowenstein (2009) in an effort to account for the success of Oklahoma's universal preschool program ( $n = 71$ ), as well as to compare proceedings in these rooms with those occurring in a multi-state sample of 241 preschools, in 25 Tulsa Head Start classrooms, and in a multi-state sample of 25 Head Start classrooms. The authors examined teachers' ability to establish a positive classroom climate, which they assessed using the *CLASS* (Pianta et al., 2004), as well as the amount of exposure to academic instruction children received, also assessed via the CE-EAS (Ritchie et al., 2002). In the case of the latter, an observer rotated their focus from one of four selected children in each classroom for a total of twenty minutes, before moving to another group of four children. Children were observed for the entire day. The academic activities coded for during these observations included a literacy activities composite measure (reflecting the proportion of time spent being read to, reading, practicing letters and sounds, and building expressive language).

Results indicate that children were engaged in some form of literacy an average of 30% of the time in Tulsa pre-K classrooms and 24% of the time in Tulsa Head Start programs. In both the multi-state Head Start sample and in the multi-state general preschool sample, children were thus engaged for 18% of the time. Phillips and colleagues then use these and other figures to shed light on a variety of similarities and differences between the Tulsa pre-K programs and the Tulsa Head Start classrooms, concluding in the end that major challenges remain in identifying classroom and teacher characteristics that make for high-quality, effective preschool environments. This study is useful in painting a general picture of the extent to which sampled teachers focused on literacy and other domains with the children in their classroom. However, the authors' reliance on a composite measure of literacy leaves the details of enacted instruction in this area unexamined.

In similar work, Howes et al. (2008) use CE-EAS data to gauge children's exposure to instruction in letters and sounds, oral language development, and being read to in 700 state-funded pre-Kindergarten classrooms in eleven states. The data upon which their study relies was collected through both the National Center for Early Development and Learning (NCEDL) Multi-State Study of Pre-Kindergarten and State-Wide Early Education Programs (SWEEP) Study (Early et al., 2005). Impressively, the combined samples of classrooms from these two companion studies comprise approximately three-quarters of children participating in state-funded preschool programs. The results presented by Howes and colleagues indicate that, on average, children spent 3% of the observation engaged in letter-sound activities, 5% engaged in oral language activities, and 5% percent being read to. The size of the data set is notable, allowing the authors to make strong claims about the positive influence of enrollment in pre-K, quality of instruction, teacher-child relationships, and exposure to literacy instruction on

academic ability. However, their analysis does not, nor was it intended to, provide great or comprehensive detail about the literacy instruction provided to children.

An important contribution in this area that takes up some of these issues is Connor, Morrison and Slominski's (2006) study of preschoolers' language and literacy experiences in 34 classrooms. Two hours of video-taped instruction per classroom were coded using the Noldus Observer Pro system (Noldus Information Technology, 2001). The coding was detailed, incorporating 25 language and literacy items. These included 4 read-aloud items, 4 writing items, 3 reading comprehension items, and items for handwriting instruction, silent sustained reading, spelling, discussion, alphabet activity, initial consonant, letter sight-sound, phonological awareness, word segmentation, vocabulary, conventions of print, and grammar and punctuation. The nested analysis (multi-level modeling) performed by the authors revealed that an average of 15 minutes (ranging from 0 to 81 minutes) were spent on language and literacy activities. Moreover, they found substantial variability in amount and types of experienced language and literacy activities, across both classrooms and children. The authors were also able to link particular elements of enacted instruction with children's vocabulary and early literacy development. For example, they found that time spent on code-focused activities were associated with growth in alphabet and letter-word recognition, while time spent on meaning-focused activities like discussion and read-alouds was associated with vocabulary growth. Finally, Connor and colleagues examined the interaction between children and activity type, revealing that preschoolers' incoming vocabulary and early literacy skills altered their growth differently across literacy activities. This study sheds much light on the enacted instruction provided to at-risk preschoolers, and even on how this instruction impacts their learning. However, despite these notable strengths, this study is limited in several respects. It is slightly concerning that

Connor et al. sampled an average of four students per classroom, and that observations were limited to several hours. And more importantly, only three classrooms of at-risk children were included in their analysis. These issues limit the extent to which their results are generalizable to this important demographic.

Stepping back, several issues and gaps in this body of literature are apparent. Few studies examine the enacted language and literacy instruction at the preschool level. Of these, only a handful focus on the opportunities for learning provided to children at-risk of facing academic difficulty in school. These extant studies, which I have reviewed above, provide insufficient detail on the enacted language and literacy instruction. In fact, the studies led by Paro (Paro et al., 2009) and Phillips (Phillips et al., 2009) simply used a composite “literacy” measure, while Howes et al. (2008) present data on only a three language and early literacy activities. In contrast, Connor et al. (Connor et al., 2006) do paint a very detailed picture of the language and literacy instruction provided to sampled children, and are the only authors to include aspects of related instructional strategies. However, their analysis provides little information on the enacted instruction provided to at-risk students. Taken together, then, the scope of these studies is limited, resulting in a relatively narrow and incomplete understanding of the language and literacy instruction provided to at-risk preschoolers.

An additional problem with extant studies designed to examine the language and literacy instruction provided to at-risk preschoolers is that they tend to consider only instruction that can neatly fit into a “literacy” content area, overlooking language and literacy-related instruction that occurs outside this narrow definition. For example, in Connor et al.’s very detailed analysis, the coding instrument was designed to capture “Language Arts” instruction, which was carefully defined as “time spent engaged in activities that require reading, writing, or reading- and writing-

related things but that are *not* focused on gaining information about another content area (science, social studies, math, drama, etc.)” (p. 668). However, such methodological moves are misaligned with the structure of early childhood curricula and, correspondingly, with the way that instruction and learning occur in early childhood classrooms. Developmentally appropriate preschool curricula integrate children’s learning within and across domains and disciplines, and encourage contextualized inquiry- and play-based learning (Copple & Bredekamp, 2009). Thus, language and literacy instruction and learning typically occur more centrally, embedded across domains and throughout the classroom. Turning once again to the GSRP as a relevant example, it is abundantly apparent that this is the case. As mentioned above, the ECSQ-PK not only discusses the importance of a contextualized, integrated and connected curriculum in general; they also highlight the importance of embedding language and early literacy development in learning experience across content areas, specifically (p. 111). Moreover, many of the emerging indicators included in the domain of language and early literacy development emphasize the importance of embedded and contextualized language and literacy instruction and learning in the GSRP. Again and again, teachers are directed to support a balanced literacy approach with reading and writing opportunities provided across the all subject domains in this important document.

Ample research also confirms that language and literacy learning occurs embedded across domains. For example, studies indicate that guided play promotes oral language development (Christie & Roskos, 2015; Dickinson & Tabors, 2001; Nicolopoulou, Cortina, Ilgaz, Cates, & de Sá, 2015; Sawyer & DeZutter, 2007; Stone & Christie, 1996). Another body of research indicates the impact that literacy-enriched play settings (e.g., Neuman & Roskos, 1992; Vukelich, 1994) and print-rich environments (e.g., Guo et al., 2012; N. E. Taylor et al., 1986) have on literacy behaviors and language and early literacy learning throughout the preschool classroom.

### **Language and literacy instruction embedded in science.**

In particular, although few studies examining instantiated language and literacy instruction include the enacted curriculum in this domain, extant research suggests that interactions and instructional strategies that foster language and literacy learning are likely to occur during science instruction and exploration. This has been addressed in documents like the National Institute for Early Education Research 2009 policy brief, whose authors describe the importance of opportunities to explore science concepts for language and literacy development (Brenneman et al., 2009). As this document describes, children engage in the use of descriptive language during scientific exploration, verbalizing questions about their observations and discussing the properties of natural objects. Preschool science experiments expose children to a variety of sophisticated new words in meaningful contexts, supporting children's vocabulary development in the process. Children engaged in observation, classification and charting during preschool scientific inquiry increase their use of comparative language. Indeed, the portion of the ECSQ-PK devoted to the domain of science includes many similar references to embedded language and literacy instruction and learning. Teachers are told to "talk with children in ways that promote children's thinking, predicting and reasoning, and provide them with accurate information and vocabulary about scientific ideas" (p. 76). They are also directed to provide an environment with rich content vocabulary and support for understanding age appropriate scientific language – for example, by providing time for reflection and posing open-ended questions about science and children's reasoning process (p. 77). Teachers are also advised to provide opportunities for children to explore, describe, predict, and document their investigations, and chances to use content vocabulary across the curriculum (pp. 76-77). The use of informational books and text during science instruction is also repeatedly encouraged (p. 77).



Research confirms that language and discussion are central to science learning. Conezio and French (2002) discuss the results of teacher observation in which participating Head Start teachers provided descriptive data on the impact that the integrated ScienceStart! curriculum had on children's learning. Teachers reported that it strongly supports language and literacy development. They described instances in which children had conversations around nonfiction books, as well as times that observations and participation in hands-on activities promoted vocabulary growth. They noted that participating children experienced increased receptive language ability due to participation in teacher-led activities, as well as increased expressive language through engaging in verbal observation and scientific reasoning. Finally, teachers reported that the science curriculum helped English language learners access and participate in classroom activities. As the authors note, these teacher observations align with research demonstrating that children are most likely to learn language and literacy skills when they use them in authentic situations (Goodman, 1986). Similarly, Mercer and colleagues examined an experimental curriculum designed to encourage children to engage in discussion and reason together, and to apply these skills in their study of science. They conclude that language and discussion are central to science learning, that they can be encouraged, and that encouraging them can scaffold the development of reasoning and scientific understanding (Mercer et al., 2004). Worth and colleagues describe a teacher training program designed to help teachers connect literacy and science in the classroom (Worth et al., 2004), providing further evidence about the connections between these domains.

Indeed, evidence indicates that young children develop their language and literacy skills during science instruction. For example, French (2004) examined ScienceStart!, a curriculum designed to foster problem solving skills, self-regulation, language development, and pre-literacy

skills in Head Start attendees through the presentation of science content. This curriculum was implemented over seven months to six cohorts. In addition to increased engagement and improved classroom behavior, French reports significant gains in receptive vocabulary scores (measured by the Peabody Picture Vocabulary Test III) in children who experienced the curriculum. The results of a similar study by Peterson and French (2008) indicate correlations between science instruction and both the quantity and quality of participating children's explanatory language. A study by Leung (2008) explored 32 at-risk preschoolers' development of scientific vocabulary after their participation in tree interactive read-aloud events followed by related hands-on science activities. Some children were also asked to retell the book after each event. Her analysis indicates that participating children who experienced the retelling event achieved significantly higher scores on vocabulary knowledge, as did older children and those who began the intervention with higher scores in vocabulary. She also found that participating children asked to retell the stories used significantly more target science vocabulary words across the retellings. Leung's work indicates that the informational book reading and hands-on activities characteristic of preschool science instruction may promote incidental vocabulary learning when retelling is incorporated. Other research has linked science instruction with children's comprehension, as well as their ability to and tendency to discuss scientific concepts (Gelman, Brenneman, Macdonald, & Román, 2009). Finally, work by Greenfield et al. (2009), empirically tested a supplementary science curriculum called Early Childhood Hands-On Science (ECHOS). ECHOS was designed to provide teachers with resources to increase their confidence about teaching science and to help them teach science by integrating multiple school readiness domains within science activities. Multivariate analysis comparing school readiness outcomes for treatment and control Head Start attendees revealed significant gains in all eight Head Start

school readiness domains, including language development and literacy, in treatment children. Yet other research suggests that science and literacy skills are mutually supportive. For example, Gelman and Brenneman found that preschool children's science content knowledge and their language skills mutually reinforce each other as they develop (Gelman & Brenneman, 2004). And work focused on older children suggests that this relationship continues through high school (Pearson et al., 2010). Together, these studies provide evidence both that language and literacy instruction is often embedded within content domains in preschools – and within science in particular –and that language and early literacy development and science learning are intrinsically linked.

However, despite these findings and the example provided by Durkin, who included social studies lessons in her examination of elementary school comprehension instruction because of the embedded comprehension instruction that occurs due the difficulty of social studies textbooks (Durkin, 1978-1979), research on preschool language and literacy instruction typically ignores relevant instruction in science. Thus, we are left with a limited understanding of the day-to-day enacted language and literacy instruction provided in preschools serving at-risk children. Given the importance of language and early literacy ability, the unique needs of economically disadvantaged children in these areas, and the language and literacy-focused goals of targeted programs like the GSRP, further research is needed to understand the opportunities for language and early literacy development experienced by these children.

### **The Present Study**

The purpose of this study is to shed light on the day to day instruction provided to at-risk children in areas that particularly foster their language and early literacy development. Given the established importance of instruction in the domains of both literacy and science to the

development of key language and early literacy skills and abilities, I ask the following research questions:

1. How much time do preschool teachers devote to literacy instruction with at-risk children?
2. Which literacy skills are most commonly taught in preschools targeting at-risk children?
3. To what extent do teachers focus on key literacy skills and related instructional strategies in preschools targeting at-risk children?
4. Within the content domain of science, what instructional strategies that are related to language and literacy development do teachers employ, and which are most commonly used?

### **Summary**

Opportunities for preschool children to develop language and early literacy skills are crucial. Research confirms that children's early ability in vocabulary knowledge, oral language comprehension, phonological awareness, print awareness, and alphabet knowledge predict later reading ability, which in turn affects children's achievement across learning domains and for years to come. For economically disadvantaged children, who are statistically more likely to begin kindergarten behind their more privileged peers in these areas, instruction in these areas is even more crucial.

Thankfully, extant research indicates that key language and early literacy skills can successfully be taught to at-risk children in preschool settings. Based on these promising findings, federal and state-funded preschool programs targeting at-risk preschoolers have been established with the hope of closing the language and literacy achievement gap. But ironically, despite the great importance placed on language and early literacy instruction and development in programs like Michigan's GSRP, we have a very limited understanding of the relevant

instruction actually provided to children attending these classrooms every day. In particular, little extant research on enacted language and literacy instruction includes related aspects of the instantiated curriculum in science, in which instruction that fosters language development is likely to occur. It is vital that this gap in the literature be addressed, and I propose to do so through this dissertation study. A deeper understanding of the instruction provided to at-risk children in areas that especially foster their language and early literacy development is needed to advance us further toward the goal of ensuring that all children arrive in kindergarten with the skills required for academic success.

## Chapter 3

### Method

Ample evidence that language and early literacy skills can be and ought to be taught to at-risk preschool children has led to the development of federal and state programs aimed at increasing children's ability in these areas. Ironically, however, we have as yet a limited understanding of the enacted instruction teachers provide to increase at-risk preschoolers' language and early literacy development in such programs. The purpose of this study is begin address this gap in the research. I examine the enacted language and literacy instruction in a naturalistic targeted preschool setting. And because science instruction relies on strategies that promote vital language development, I include an examination of key aspects of the instantiated science instruction. Specifically, I address the following research question in this study:

1. How much time do preschool teachers devote to literacy instruction with at-risk children?
2. Which literacy skills are most commonly taught in preschools targeting at-risk children?
3. To what extent do teachers focus on key literacy skills and related instructional strategies in preschools targeting at-risk children?
4. Within a content domain like science, what instructional strategies that are related to language and literacy development do teachers employ, and which are most commonly used?

The results that emerge from these research questions will provide essential descriptive information about the language and literacy instruction experienced by at-risk children in targeted school readiness programs. Such evidence is needed to inform the decisions of researchers, practitioners, and policy makers working to ensure that at-risk children have access to high quality instruction in these key domains.

In this chapter, I describe the methodology used to address my research questions. I first provide information about the participant teachers and the children who attended their classrooms, as well as the curriculum in use in these rooms. I then describe the data collection method, providing detailed information about the development and testing of the teacher log used in this study and the items collected via the log. I next discuss the procedure, including teacher training, the timeline of data collection, and the scoring of the teacher log items. Finally, I describe the analytic strategy used to address each of my research questions.

## **Research Methods**

### **Participants**

The data for this dissertation were collected in schools located just outside Detroit, Michigan. In total, fourteen preschool teachers participated in this study. Teachers' average experience teaching preschool was 3.9 years (MIN = 2, MAX = 5). 80% of participating teachers held an MA and 20% a BA, and 100% of the teachers had an Early Childhood Endorsement from the state of Michigan. Teachers were 100% White females.

Participating teachers headed fourteen preschool classrooms housed in three schools within a single district (nine classrooms in one school, four in a second school, and the final classroom in a third school). All fourteen classrooms were part of the previously discussed state-funded Great Start Readiness Program (GSRP), which aims to increase school readiness in children who are at greater risk of struggling academically. In particular, eight factors

contributing to educational risk are used to identify children eligible to attend a GSRP preschool. These risk factors are: (a) extremely low family income (below 200% of the federal poverty level [FPL]); (b) low family income (200-300% of FPL); (c) diagnosed disability or identified developmental delay; (d) severe or challenging behavior (child has either been expelled from preschool or child care center or referred by a health professional); (e) primary home language other than English; (f) parent(s) with low educational attainment (has not graduated from high school or is illiterate); (g) abuse/neglect of child or parent; and (h) environmental risk (parental loss [due to death, divorce, incarceration, military service or absence], sibling issues, teen parent, family homeless or without stable housing, family resides in a high-risk neighborhood, or pre- or postnatal exposure to toxic substances known to cause learning or developmental delays). In terms of prioritization of these risk factors, children born into families with extremely low incomes are enrolled first. Remaining slots are next offered to children born into families with low incomes and at least two other risk factors. Any additional remaining slots are then offered to children living in low-income families and one risk factor. Finally, any remaining slots are offered to children whose family incomes are above 300% of the FPL but who have more than two risk factors. Up to 25% of slots can be filled with children from this last category. After this point, spots are offered, but tuition is charged (State of Michigan, 2011). Based on these entrance criteria, the four-year-olds attending the GSRP preschools sampled in this study are all at educational risk, although my data do not include the particular risk factors of each child. Also relevant in painting an accurate picture the educational risk of these children is the fact that, on average, 93.9% of children enrolled in these classrooms qualified for free and reduced lunch (MIN = 83%, MAX = 100%).



Participating GSRP teachers used The Creative Curriculum. This popular curriculum (Hyson, 2008) was designed for preschool-aged children, and is described as a research-based, developmentally-appropriate, comprehensive curriculum promoting children's socio-emotional development and learning in literacy, science, math, and social studies (Teaching Strategies for Early Childhood, 2014). The Michigan Department of Education lists the Creative Curriculum as both research-based and research-validated in the GSRP implementation manual, although it should be noted that independent researchers disagree as to the effectiveness of the Creative Curriculum in increasing children's academic ability (e.g., Durham, 2013; Preschool Curriculum Evaluation Research Consortium, 2008). I discuss this point further in Chapter 5.

Each teacher's classroom was attended by at least 14 children. In total, instructional data were collected on the enacted curriculum of 220 children ( $M = 58.14$  months,  $SD = 3.38$ ; 52.6% boys and 47.4% girls). Sampled children's ethnicity distribution was as follows: 66.8% European-American, 22.8% African-American, 1% Asian, 3.1% Hispanic, 2.1% Middle Eastern, and 4.1% bi-/multi-racial. These demographic variables were largely homogeneously distributed across classrooms. For example, a one-way ANOVA revealed the strength of differences in child age across classrooms. A pre-test of homogeneity of variance using the Levene statistic revealed a non-significant result ( $p = .643$ ), allowing for the use of one-way ANOVA. The ANOVA results ( $F(13,180) = 1.244$ ,  $p = .252$ ), indicate that there is no statistically significant difference in the age of sampled children across classrooms. This was confirmed through post hoc comparisons using the Tukey HSD test. Similarly, the results of a Pearson's Chi-Squared analysis of the distribution of sampled children's gender distributions across classrooms confirm that males and female were equally distributed ( $\chi^2(1) = 7.982$ ,  $p = 0.845$ ). Results regarding the distributions of participating children's ethnicities across classrooms are less clear. The results of

a Pearson's Chi-Squared analysis were significant ( $\chi^2 = 9.581$ ,  $p = 0.004$ ), suggesting that some ethnic groups were not homogeneously distributed across classrooms. However, because several ethnicity categories contained only a handful of children and a minimum value of 5 could therefore not possibly be expected in the majority of cells, this Chi-Squared analysis was not valid. A Fischer's exact test, while designed to resolve this problem, could not be run due to the relatively large number of children involved in this study. A quick comparison of the distribution of child ethnicities across classrooms suggests that the ethnicities of the approximately 14 children randomly sampled per classrooms did vary somewhat (see Table 1). However, the statistical significance of these differences in distributions across classrooms remains unknown.

Table 1: *Descriptive statistics of the distribution of child ethnicities by classroom (n= 194; listwise deletion of missing data)*

| Teacher Number | Ethnicity as observed by assessor |                  |               |          |                |                 | Total |
|----------------|-----------------------------------|------------------|---------------|----------|----------------|-----------------|-------|
|                | Caucasian                         | African American | Asian/ Indian | Hispanic | Middle Eastern | Biracial/ Other |       |
| 1              | 12                                | 2                | 0             | 0        | 0              | 0               | 14    |
| 2              | 13                                | 0                | 0             | 1        | 0              | 0               | 14    |
| 3              | 8                                 | 4                | 0             | 2        | 0              | 0               | 14    |
| 4              | 11                                | 3                | 0             | 0        | 0              | 0               | 14    |
| 5              | 11                                | 0                | 0             | 1        | 0              | 0               | 12    |
| 6              | 12                                | 1                | 1             | 0        | 0              | 0               | 14    |
| 7              | 8                                 | 4                | 0             | 1        | 0              | 1               | 14    |
| 8              | 8                                 | 3                | 1             | 0        | 1              | 1               | 14    |
| 9              | 12                                | 2                | 0             | 0        | 0              | 0               | 14    |
| 10             | 6                                 | 7                | 0             | 0        | 0              | 1               | 14    |
| 11             | 8                                 | 3                | 0             | 1        | 1              | 1               | 14    |
| 12             | 11                                | 2                | 0             | 0        | 1              | 0               | 14    |
| 13             | 6                                 | 4                | 0             | 0        | 0              | 4               | 14    |
| 14             | 3                                 | 9                | 0             | 0        | 1              | 0               | 14    |

Regardless, it is reasonably safe to describe these classrooms, in which similar proportions of at-risk males and females of similar ages were instructed using the same curriculum within one state-funded program, as homogenous in nature.

### **Data Collection**

The data for this study were collected by repeatedly gathering snapshots of enacted language and literacy instruction via a teacher time diary, or “log.” This innovative method was chosen because of certain advantages that repeated-measure logs have over qualitative observations and large-scale surveys. Logs are more cost-efficient than observation, allowing for the collection of many more data points on enacted instruction and, thereby more robust analyses of the relevant data. In addition, using repeated logs allows researchers to overcome issues of variability in teaching; observations may fall on an atypical day, or may not capture the breadth of instruction, which varies from day to day according to classroom lesson plans and weekly schedules. By using logs repeatedly over time, a more complete representation of the enacted curriculum can easily and efficiently be gathered.

Logs may also have several advantages over large-scale surveys, the validity and accuracy of which have been questioned (Mayer, 1999; Mullens & Kasprzyk, 1999). Reporting accuracy is hampered when teachers are asked to reflect on a week’s-, month’s-, or even year’s-worth of teaching in one survey. More specifically, imprecise teacher memory negatively impacts the accuracy of such surveys, particularly when teachers are asked to reflect on the frequencies of particular instructional activities (Burstein et al., 1995; Smithson & Porter, 1994). Data gathered via daily teacher logs may therefore be more accurate and nuanced than information taken from annual questionnaires. Moreover, research investigating the reliability and validity of teacher logs suggests that this method of data collection accurately reflects

classroom proceedings. For example, early work by Ball and colleagues (Ball, Camburn, Correnti, Phelps, & Wallace, 1999) tested a web-based log designed to capture enacted math and reading instruction in the primary grades, with encouraging results. Their findings included a moderately strong (75%) agreement on the content of reading lessons between researcher-observers and teachers completing the log. Other work has since corroborated these findings. Hill (2005) published findings on a similar elementary mathematics teacher log, reporting match rates among trained observers and teachers that ranged from 1.00 (100% agreement) to .40. Around half of the items had match rates above 80%, and another 20% had rates between .70 and .80. (See also Floden, 2002).

In particular, the instrument used in this dissertation was closely based on that of Rowan and colleagues (Rowan et al., 2004), who, having identified challenges in measuring the enacted curriculum, developed an instructional log to efficiently capture enacted reading and language arts instruction provided by 150 teachers to their high-poverty third graders. As described in Chapter 1, their log asks teachers to reflect on a focal student, rather than to report on the instruction provided to the classroom more generally. Teachers estimated the total time that the focal child experienced reading and language arts instruction, the extent to which the child experienced focused instruction in related topics and sub-topics, as well as the instructional strategies used by the teacher and the materials used by the focal child during enacted instruction. As the authors note, log data gathered for any one focal child on a given day is unlikely to accurately reflect that child's typical experience. In other words, if log data reveal that a given child spent 5 minutes on literacy on a certain day, it does not follow that *that child* typically experiences 5 minutes of daily enacted literacy instruction. However, mean responses

on log data accurately reflect the average instruction experienced by *the average child* in a teacher's classroom (Rowan et al., 2004).

Taking their analyses one step further, Rowan et al. used Hierarchical Linear Modeling (HLM) to determine how many times such a log must be administered to obtain reliable data on differences in the enacted curriculum *among* teachers. Their analysis of teachers' enacted literacy instruction revealed variation in curriculum enactment occurring across occasions, students, and teachers, accounting for the nested nature of the data. Among other things, their results indicate that teacher logs reliably capture differences in time spent on enacted curriculum among teachers after about 14 logs (p. 81). Rowan et al. went on to explain that, even in cases with large variance in content and skill coverage from log to log for which the use of HLM to examine variation among teachers may not be appropriate, it is possible to aggregate over all occasions and work with summary data. In short, the authors demonstrated the ways in which even relatively small samples of logs in which teachers report on the instruction provided to a target student can be used to examine the enacted curriculum in depth. Moreover, their log was later supported by additional studies confirming this methodology as a way to examine enacted curriculum (Rowan & Correnti, 2009), as well as a validity study in which log data were found to be far more cost effective and only very slightly less reliable than observational data (Camburn & Barnes, 2004).

### **Teacher Log Development**

The present instrument is based closely on that of Rowan, Camburn, and Correnti, taking up their invitation for researchers to develop and use teacher logs to examine the enacted curriculum. The development of the instrument occurred in two phases. First, a pilot teacher log was designed to capture enacted instruction in preschool classrooms (Carpenter, Neuman, & Demonte, 2007). The identification of items to be included in this pilot version of the instrument

involved reviewing relevant literature as well as the National Association for the Education of Young Children (NAEYC) standards for best practice. In addition, detailed feedback from experts in early childhood classroom practice was sought. In this way, items were chosen that were intended to be broadly representative of preschool instruction. Unlike the log championed by Rowan and colleagues, however, this pilot version of the log captured enacted curriculum at the classroom level.

The pilot log was field-tested using a sample of teachers not involved in the initial development process, in order to test its reliability and validity. Trained observers conducted randomly-scheduled, detailed observations, which were then compared with log data. Analysis using percent agreement, Gamma, and weighted Kappas revealed strong exact (76% and 70%) and adjacent agreement (89% and 86%), suggesting that the pilot log was a reasonably valid and reliable measure of early childhood teacher enacted instruction. Both the overall instrument and the literacy subscale also demonstrated strong internal consistency ( $\alpha = .78$  and  $\alpha = .76$ ), and specific subscales exhibited strong item-total correlations. See Carpenter et al. (2007) for detailed results and statistical analyses.

Following these initial promising results, the log was set aside for several years, at which point several revisions were made that led to its final structure. The most fundamental change made was the alteration of the log such that teachers were asked to reflect back on the experiences of a focal child, rather than their classroom-level practice. This step was undertaken based on the argument presented by Rowan and colleagues (Rowan et al., 2004). As described above, a key value of this methodological choice over examining teacher instruction at the classroom level is that it may more accurately capture what the average child is experiencing, since curriculum coverage may be different across students within a classroom. This is especially

likely to be the case in preschools, where much time is budgeted for "free choice," and children are free to move from activity to activity for large portions of the day. Revision of the initial log also involved several additional steps taken to further increase the log's focus on the enacted language and literacy instruction. A segment that focused on the general classroom was removed. This made room for two additional language and literacy sections. Due to the established connections between science instruction and language and literacy learning, a section designed to capture the instructional strategies used during enacted science instruction was also added.

### **Items**

The final teacher log contains seven distinct sections, within which are contained 38 total items. The first section of the log is designed to gather basic information, including the names of the school, student and teacher. The next five sections of the log capture the language and literacy instruction provided to the child in question. In section two, as was the case with Rowan's instrument, the present log asks teachers to reflect on the total amount of time the target student spent on literacy over the course of the day. Specifically, language and literacy activities were defined as "time spent on reading and writing, for example, reading a storybook, learning new words and letters, writing his/her name." Teachers were prompted to include all instruction related to reading and writing that the child in question received, including routine times and instruction that took place in another room or by another teacher.

In sections three through six, participating teachers were asked to indicate the extent to which they focused on a number of major topics that, as demonstrated in Chapter 2, are highly predictive of reading ability: vocabulary, oral language comprehension, print awareness, and "letter names and sounds." (This final topic combines two distinct skills discussed in Chapter 2: alphabet knowledge and phonological awareness. These skills were presented to teachers in this

way to prevent any confusion on their part in responding to the log questions; the term “letter names and sounds” more closely aligns with preschool curricula and typical instruction presented by preschool teachers). Each of these four literacy skills sections contains items measuring the extent to which the teacher focused on that area with the child in question. Each section also contains items measuring the extent to which specific instructional strategies, or teacher practices, were employed during instruction in that area. For example, vocabulary instructional items include learning new words and word meanings, as well as using words in a number of situations. Oral language comprehension items include activating prior knowledge and making predictions. In the print awareness section, items focus on noticing and interacting with print, as well as connecting print with pictures. Letter and sound knowledge items capture instruction on letter names and sounds, as well as awareness of onset sounds, rhyming, blending, and segmentation. Again, this format parallels the log designed and tested by Rowan and colleagues, which asked teachers about the extent to which age-appropriate language arts skills (e.g., comprehension, word analysis, reading fluency, grammar, and reading strategies) were focused on with the target child, as well as the nature and intensity of instructional strategies related to these skills.

The seventh and final section of the log focuses on aspects of the teacher’s instantiated science instruction, which was defined as including “science curriculum, science activities, science related books, and science projects.” Participant teachers were asked to report which of a set of strategies that promote language development they used during science instruction with the child in question. These strategies include helping to identify the shape and texture of an object, explaining why predictions were correct or incorrect, and making real-world observations. Such strategies are typical of preschool science instruction, which capitalizes on children’s exploration



of the world around them and features complex language use during joint discussion and reasoning (Brenneman et al., 2009; Mercer et al., 2004; Michigan State Board of Education, 2005). They are also examples of authentically embedded language, which has been shown to increase the likelihood that children will learn language and literacy skills (Goodman, 1986), particularly when children are engaged in conversation about objects or activities that have captured their attention (Dunham, Dunham, & Curwin, 1993; Yu & Smith, 2012). In addition, extant research indicates that these science instructional strategies lead to the development of language skills in preschool children. They require rich, interactive language use on the part of the teacher, including the use of uncommon vocabulary and complex sentence structures, more frequent and extended utterances, and the engaging of children with questions and comments, all of which have been linked to children's language development (Dickinson, 2001; Elley, 1989; Girolametto & Weitzman, 2002; Hart & Risley, 1995; Hoff, 2006; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; McCartney, 1984; NICHD Early Child Care Research Network, 2000). Moreover, research specifically indicates that preschool science instructional strategies such as those included in the teacher log promote children's language development, particularly in the areas of vocabulary development (French, 2004; Leung, 2008), expressive language (Peterson & French, 2008), and oral language comprehension (Gelman et al., 2009).

In sum, the teacher log captures the detailed enacted language and literacy instruction in a way that is broadly supported by rigorous research, confirmed by pilot testing, and aligned with how we know language and literacy instruction and learning occur in preschool classrooms. See Appendix A for an excerpt of the log.

## **Procedure**

Prior to data collection, participating teachers were brought to the School of Education at the University of Michigan, where research staff conducted an approximately 45-minute long

training session for teachers. Staff explained the procedure, demonstrated how to fill out the log and defined the included items. During this training section, teachers were encouraged to ask questions and were given handouts containing relevant definitions and procedural information. To further improve reporting accuracy, teachers were also provided with several practice trials with the online questionnaire during this training session. Once logging began, teachers were encouraged to contact the researcher in charge of data collection with any questions, and were provided with a contact email and direct phone number. Teachers were also involved in an incentive plan. In order to both increase teacher log response rates and to encourage participation in the broader Ready to Read research initiative, teachers were provided with self-selected books for their classrooms. Together, the teacher training and incentive plans achieved the goals of increasing response rates and response accuracy.

During the data collection period, teachers completed an instructional log daily over the course of about five weeks, each time for a different child. After each preschool class was dismissed, participating teachers received an email with a link to the log, which was available online via the internet-based survey software and questionnaire tool, “SurveyMonkey”. The daily email also contained the name of “today’s student,” taken from a randomly-ordered class list, as well as the name of a second randomly-selected student, in case the first child was absent. Teachers then followed the link and completed the survey for that day’s randomly-sampled student. Basic information on the teacher and child were collected, along with detailed information about the enacted language and early literacy instruction provided to the child, as described above. See Appendix B for the complete text of the daily teacher email.

Because the log was administered electronically, it was sensitive to teacher responses; when teachers reported that they instructed on a particular language and literacy element that

day, they were automatically provided with additional questions designed to capture this instruction in detail. Conversely, if a teacher indicated that they had not touched on an element, all sub-questions pertaining to that element were automatically skipped. These sub-questions included checklists of more detailed instructional content and strategies, as described above.

Once data were collected on the enacted instruction offered to a certain child, that child's name was removed from the randomly-ordered list. If log data indicated that the focal child was absent, however, his or her name was subsequently returned to the randomly-generated list, in order to avoid losing valuable data. In total, logs for 220 children were collected.

### **Scoring**

Items asking the extent to which teachers focused on language and literacy skills with the child in question were rated on a four-point, Likert-type scale (“a lot”, “a little”, “touched on briefly”, and “not at all”). Items measuring instructional strategies within each language and literacy skill (e.g., for vocabulary, “learned new words in books” or “focused on the meaning of unknown words”) were rated on a three-point scale (“a focus of instruction”, “touched on briefly”, and “not instructed”). Items measuring the use of instructional strategies that promote language development during science instruction were rated on binary scale; teachers responded with a “yes” or “no” about whether each instructional strategy was used with the child in question that day.

### **Data Analysis**

#### **Analytical Strategies**

Log data were retrieved from the SurveyMonkey site and entered into SPSS software (version 20.1, IBM). These data were then combined with child, teacher and school information. Analyses proceeded from this point.

My goal was to provide a detailed description of the typical day-to-day language and literacy instruction provided by the average teacher to her average student in a targeted preschool program. Thus, I aggregated data across teachers' log responses about the instruction experienced by their randomly chosen focal children. The mean responses for each teacher represent the enacted instruction provided by that teacher as experienced by the average individual child in her classroom. This method of data collection and analysis is based in the understanding that, although the data for a particular child on a particular day will not necessarily be representative of the instruction typically provided to that child, when averaged across children in a particular classroom, log responses are representative of the average enacted instruction provided by that teacher (Rowan et al., 2004). It is also influenced by the understanding that, although a teacher may provide a certain amount of literacy instruction over the course of a day, every child in the room will not necessarily receive that instruction. This may be especially true in preschools, where much play-based instruction takes place in small groups or individually, as teachers move from one activity center to the next. This analytical strategy was used in addressing all of my research questions, alongside the additional methods described below.

### **Procedures Used to Address the Research Questions**

To address my first question (*How much time do preschool teachers devote to literacy instruction with at-risk children?*), I have calculated the average number of teacher-reported minutes children spent on literacy activities. As described above, mean responses on log data have been shown to accurately reflect the average instruction experienced in a particular classroom. Thus, averaging teacher-reported minutes spent on literacy revealed the average child-experienced enacted instruction provided by the teacher. Many sampled classrooms offered

half-day preschool programs. Assuming children were sleeping during naptime and eating during meals, the schedules for full-day classrooms offered almost exactly twice the minutes of opportunity for instruction and activities. Therefore, I recoded time spent on both literacy and science activities in full day programs such that that number was divided in half. Thus, the results addressing my first research question reflect the number of minutes of enacted literacy instruction per half-day of preschool.

I addressed my second question (*Which literacy skills are most commonly taught in preschools targeting at-risk children?*) by aggregating teacher Likert-scale response for the extent to which four key literacy skills (vocabulary, oral language comprehension, print awareness, and letters and sounds) were focused on in classrooms. To determine which literacy skills are most commonly taught in sampled preschools, I then calculated and compared the median and mode response to the log question “How much did you focus on [LITERACY SKILL] with [CHILD NAME] today?”

I addressed my third question (*To what extent do teachers focus on key literacy skills and related instructional strategies in preschools targeting at-risk children?*) by using this same aggregate data, as well as aggregated responses for the questions investigating the extent to which specific instructional strategies within each literacy skill were focused on (e.g., for print awareness, pointed out familiar print, connected pictures and print, and followed print from left to right/top to bottom with finger.) I calculated and compared the percentage of time each skill was focused on “a lot,” focused on “a little,” “touched on briefly” or “not at all” taught in order to discover the extent to which skills and instructional strategies were focused on in sampled classrooms. Similarly, I calculated and compared the percentage of time each instructional strategy was “a focus of instruction”, “touched on briefly”, and “not instructed” on at all (also

research question three). All Likert-scale responses were coded as 1 – 4 (or 1-3 in the case of instructional strategies), with “a lot” given the value 1, etc.

Finally, to address my fourth research question (*Within a content domain like science, what instructional strategies that are related to language and literacy development do teachers employ, and which are most commonly used?*) I aggregated teacher responses indicating whether or not teachers used a particular instructional strategy known to promote language development, in the context of teaching science, with the focal child that day. I then compared average teacher responses across instructional strategies to determine which were most commonly used in sampled classrooms.

### **Conclusion**

This study samples 14 GSRP preschool teachers to examine the enacted language and literacy instruction provided by them to their students. Data were collected via an online log that teachers filled out for a different randomly-chosen focal child each day. In total 220 logs were collected. I then used descriptive statistics to analyze the data. My analysis began with calculations of the time devoted to language and literacy instruction with the average child in sampled classrooms over the course of the average day. I then determined which of four key literacy skills were most commonly taught to children by participating GSRP teachers, and the extent to which these skills were focused on. I next calculated the extent to which a number of related instructional strategies were used, on average, by participating GSRP teachers with the children in their classrooms. Finally, based on research linking preschool science instruction with both authentic rich language use and language learning, I determined whether participating teachers used a set of language-rich instructional strategies during their science instruction with their average student.

The goal of this study was to provide an initial detailed description of the language and literacy instruction actually experienced by the average GSRP preschooler. Current classroom decisions and policy debates are based largely on the *assumption* that a great deal of instruction in language and literacy occurs in targeted preschools like the GSRP, which were designed to increase school readiness and emphasize language and literacy learning. By providing a better understanding of the enacted language and literacy instruction actually currently experienced in targeted preschool programs, this dissertation study will inform efforts to improve instruction in these classrooms, thereby closing the language and literacy achievement gap and advancing us closer toward the goal of educational equity.

## Chapter 4

### Results

The primary goal of this study was to describe the enacted language and literacy instruction currently provided in a group of 14 GSRP preschool classrooms targeted to at-risk children. I report findings based on data gathered through teacher logs in which the language and literacy instruction provided to that day's focal child was reported. In total, the instruction provided to 220 preschoolers was measured with the use of log data. Using these data, I address the following research questions:

1. How much time do preschool teachers devote to literacy instruction with at-risk children?
2. Which literacy skills are most commonly taught in preschools targeting at-risk children?
3. To what extent do teachers focus on key literacy skills and relevant instructional strategies in preschools targeting at-risk children?
4. Within the content domain of science, what instructional strategies that are related to language and literacy development do teachers employ, and which are most commonly used?

In this chapter, I present descriptive findings about both the quantity and nature of language and literacy instruction provided to the average preschooler in sampled GSRP classrooms. I begin by reporting the average number of minutes teachers spent on total language and literacy instruction with individual children in their classrooms. I then present findings that describe this



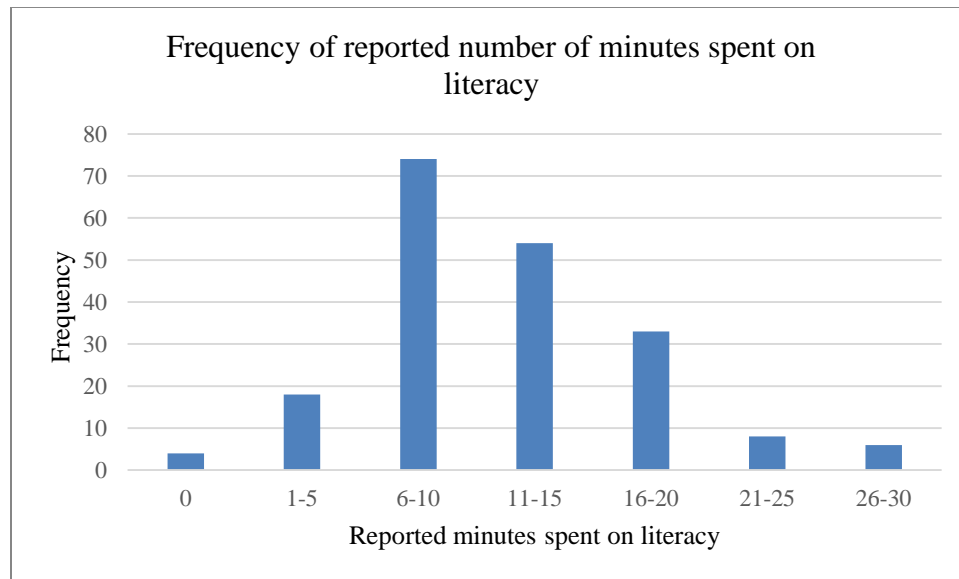
instruction – including which of the four key language and literacy skills examined in this dissertation (vocabulary, oral comprehension, print awareness, and knowledge of letters and sounds) are most commonly taught, and the average extent to which these are focused on by teachers with their students. I next present findings on which of a set of common research-based instructional strategies are used by teachers to teach these language and literacy skills to their preschoolers. Finally, I report my results regarding which of a set of common science instructional strategies known to promote language and literacy development are used by participating teachers.

### **Research Question 1: How Much Time Do Preschool Teachers Devote to Literacy Instruction With At-risk Children?**

My analysis began with an investigation of the self-reported time that teachers in targeted, state-funded preschool classrooms devote to language and literacy instruction with children in their care. Such instruction was identified as “time spent on reading and writing, for example, reading a storybook, learning new words and letters, writing his/her name.” Instructions were included in the text of the daily log itself that prompted teachers to include *all* activities and instruction related to reading and writing that that day’s randomly chosen focal child experienced, including that which was enacted by another teacher or in another room (e.g., story time with the school librarian) and routine times (e.g., transitions).

Having gathered participant teacher responses to this log item, I aggregated them across teachers, revealing the time that participant GSRP teachers recalled spending on enacting language and literacy instruction *with their average student* (as opposed to the average total time that *teachers* spent on language and literacy instruction over the course of a typical day). Descriptive statistics suggest that the average teacher-reported time per half day in which children experienced language and literacy instruction was 13.07 minutes. Teacher reports of

total time spent on language and literacy instruction with the average GSRP student ranged from 0 minutes to 30 minutes, with a standard deviation of 5.79. Teacher-reported time devoted to enacted instruction in this area was normally distributed, with most teachers reporting that the child in question experienced between 6 and 10 minutes of literacy instruction that (half) day (see Figure 1).



*Figure 1:* Frequency of reported minutes spent on literacy instruction per half day

In order to provide a clearer understanding of how self-reported time devoted to language and literacy varied across teachers, I next compared the mean number of minutes that each teacher recalled spending on language and literacy with their focal children. Results suggest that, although most teachers reported spending similar average numbers of minutes on language and literacy instruction with that day’s focal child (e.g., between 10 and 16 minutes a day), some teachers stood out somewhat as outliers (see Table 2). For instance, Teacher 1 reported spending only a little under 9 minutes per half day, on average, with her students. Similarly, Teacher 5 reported spending just under 10 minutes per half day, on average, with her at-risk preschoolers. Teacher 9 reported spending a little over 8 minutes per half day on language and literacy

instruction. In contrast, Teacher 6 recalled spending almost 19 minutes with her average student on language and literacy instruction, and Teacher 2 reported spending just under 17 minutes per half day on such activities.

Table 2: *Descriptive statistics of time spent on language and literacy instruction by classroom (n= 194; listwise deletion of missing data)*

| <b>Teacher</b> | <b>N</b> | <b>M</b> | <b>SD</b> | <b>Range</b> |
|----------------|----------|----------|-----------|--------------|
| 1              | 14       | 8.93     | 3.29      | 5.00-15.00   |
| 2              | 14       | 16.79    | 5.04      | 5.00-25.00   |
| 3              | 14       | 12.14    | 3.78      | 5.00-20.00   |
| 4              | 14       | 11.43    | 3.06      | 5.00-15.00   |
| 5              | 12       | 9.92     | 10.46     | 0.00-30.00   |
| 6              | 14       | 18.57    | 3.63      | 12.50-25.00  |
| 7              | 14       | 11.61    | 4.86      | 7.50-22.50   |
| 8              | 14       | 16.43    | 4.97      | 5.00-20.00   |
| 9              | 14       | 8.21     | 3.72      | 5.00-15.00   |
| 10             | 14       | 15.00    | 4.90      | 10.00-22.50  |
| 11             | 14       | 12.15    | 4.23      | 10.00-20.00  |
| 12             | 14       | 11.79    | 3.17      | 5.00-15.00   |
| 13             | 14       | 16.07    | 8.64      | 5.00-30.00   |
| 14             | 14       | 13.57    | 3.06      | 7.50-17.50   |

A one-way ANOVA revealed the strength of these differences in minutes of enacted language and literacy reportedly provided by participant teachers. A pre-test of homogeneity of variance using the Levene statistic revealed a significant result ( $p < .001$ ) suggesting that the homogeneity of variance assumption was not met and that the use of one-way ANOVA was inappropriate. Therefore, the more rigorous Welch statistic was used. The subsequent results ( $F(13,68.86) = 7.54, p < .001$ ), indicate that statistically significant differences in the amount of enacted language and literacy instruction reportedly offered by participant teachers exist even accounting for the unequal variances between groups. Post hoc comparisons using the Tukey HSD test suggest that the average numbers of minutes devoted to language and literacy instruction by

Teachers 1, 6, and 9 were particularly statistically significantly different from those of their colleagues. For instance, Teacher 1 recalled spending an average of only 8.57 minutes per half day (just 2.86 minutes an hour) with her average student. This results was significantly smaller than the previously reported results of Teacher 2 ( $p = .005$ ), Teacher 6 ( $p < .001$ ), Teacher 8, ( $p = .010$ ) and Teacher 13 ( $p = .020$ ), who recalled spending an average of between around 16 and around 18.5 minutes per half day on language and literacy instruction with their students. Similarly, Teacher 9 ( $M = 8.21$  mins) reported statistically significantly fewer minutes spent on language and literacy with their average student than did Teacher 3 ( $p = 0.001$ ), Teacher 6 ( $p < 0.001$ ), Teacher 8 ( $p = 0.003$ ), Teacher 10 ( $p = 0.035$ ), or Teacher 13 ( $p = 0.005$ ). In contrast, results suggest that the average number of minutes Teacher 6 recalled spending on enacted language and literacy instruction with her students ( $M = 18.57$  mins) were very often statistically significantly *greater* than those reported by her colleagues. In particular, she reported statistically significantly more minutes spent on enacted language and literacy instruction than did Teacher 1 ( $p < 0.001$ ), Teacher 4 ( $p = 0.020$ ), Teacher 5 ( $p = .002$ ), Teacher 7 ( $p = 0.027$ ), Teacher 9 ( $p < 0.001$ ), and Teacher 12 ( $p = 0.035$ ).

These results raise the possibility that, although they teach in the same state-funded program and follow the same overarching curriculum (the Creative Curriculum) GSRP teachers vary in the average dose of language and literacy instruction that they provide to their at-risk students. I speculate about possible causes for these differences in Chapter 5. It is worth noting here, however, that although these differences may seem insignificant, they are well worth considering; extrapolated over a week, a month, and a school year such differences would result in vastly different doses of exposure to language and literacy instruction for the average child in these classrooms (see Figure 2). My results suggest that this may be particularly true for children

led by Teachers 1 and 9, who are receiving far fewer minutes of language and literacy instruction.

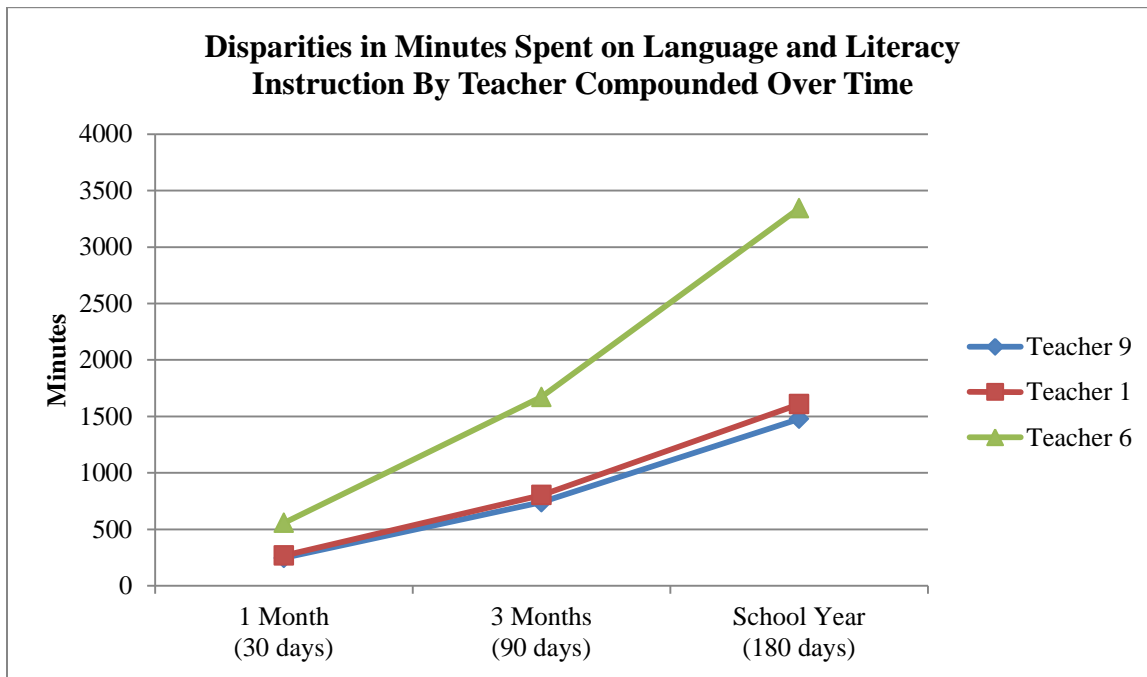


Figure 2: Disparities in minutes spent on language and literacy by teacher compounded over time

It is also interesting to note differences in the *ranges* of reported minutes spent on language and literacy across teachers. Referring back to Table 2, the range of reported minutes of instruction reported by Teacher 5, for example, stands out from the others. Teacher 5 recalled spending between 0 and 30 minutes with her students per half day. In contrast, many teachers reported a range of about 10 minutes (e.g., Teachers 1, 4, 9, 12, and 14). This raises the possibility that Teacher 5, despite providing an average of only 9.92 minutes of language and literacy instruction per half day, was successful in differentiating that instruction such that children in her class in greater need of language and literacy skill development received up to 30 minutes per half day of instruction, while others were less intentionally targeted. In other words, although the data gathered for this dissertation project do not support the child-level analyses

needed to address this possibility, it may be that participant teachers varied in their ability to provide differentiated, needs-based instruction to their students. Again, I discuss this point further in Chapter 5.

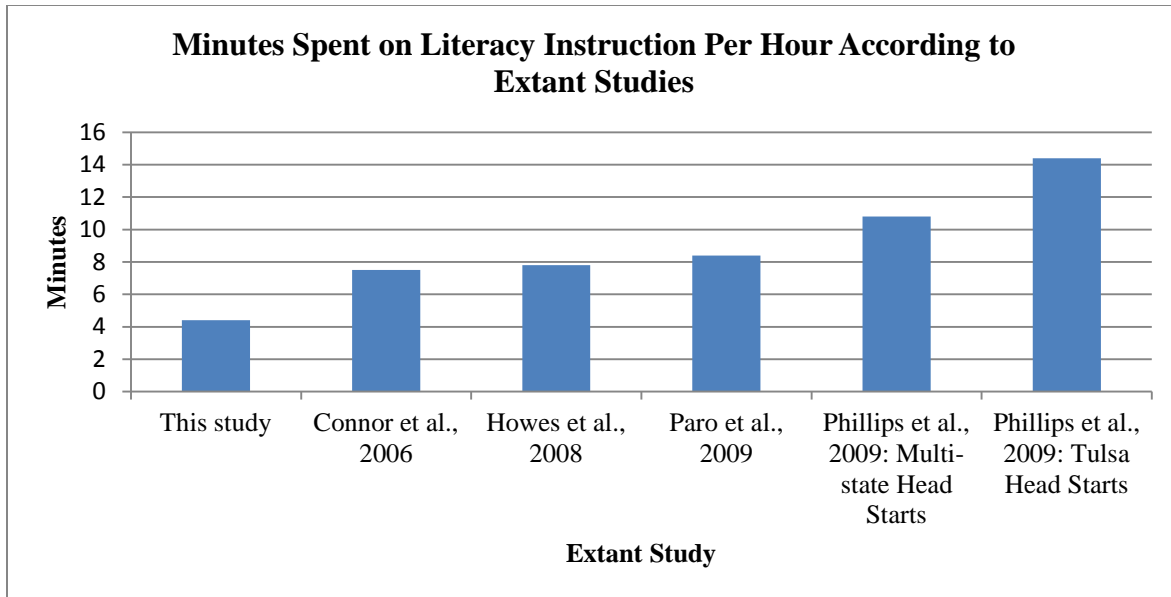
To yet further understand teachers' enactment of language and literacy instruction with their students, I looked across the sample to determine whether teachers systematically provided either their male or female students with more language and literacy instruction. An independent-sample t-test suggested no significant differences in the number of teacher-reported minutes of enacted language and literacy instruction provided to males and females enrolled in the fourteen participating GSRP classrooms,  $t(189.78) = -1.22, p = 0.22$ . Rather, results indicated that teachers recalled providing the males and females in their classrooms with very similar amounts of language and literacy instruction (see Table 3).

Table 3: *Results of t-test and descriptive statistics for time spent on language and literacy by gender (n= 194)*

|  | Gender |      |     |        |      |    | 95% CI for Mean Difference | T     | Sig. | df     |
|--|--------|------|-----|--------|------|----|----------------------------|-------|------|--------|
|  | Male   |      |     | Female |      |    |                            |       |      |        |
|  | M      | SD   | n   | M      | SD   | N  |                            |       |      |        |
| Minutes of language and literacy instruction | 12.59  | 5.77 | 102 | 13.61  | 5.79 | 92 | -2.66, 0.62                | -1.22 | 0.22 | 189.78 |

The results of this t-test contradict general wide-spread perceptions that females are more likely to seek out and be provided with language and literacy activities (Huttenlocher, Haight, Bryk, & Seltzer, 1991), in part based on evidence that they more quickly develop both the ability to focus and capabilities related to language and literacy development (Pascualvaca et al., 1997; Zambrana, Ystrom, & Pons, 2012). Rather, the results of my analysis suggest that the at-risk children taught by participating GSRP teachers may have received quite similar amounts of instantiated language and literacy instruction, regardless of their gender.

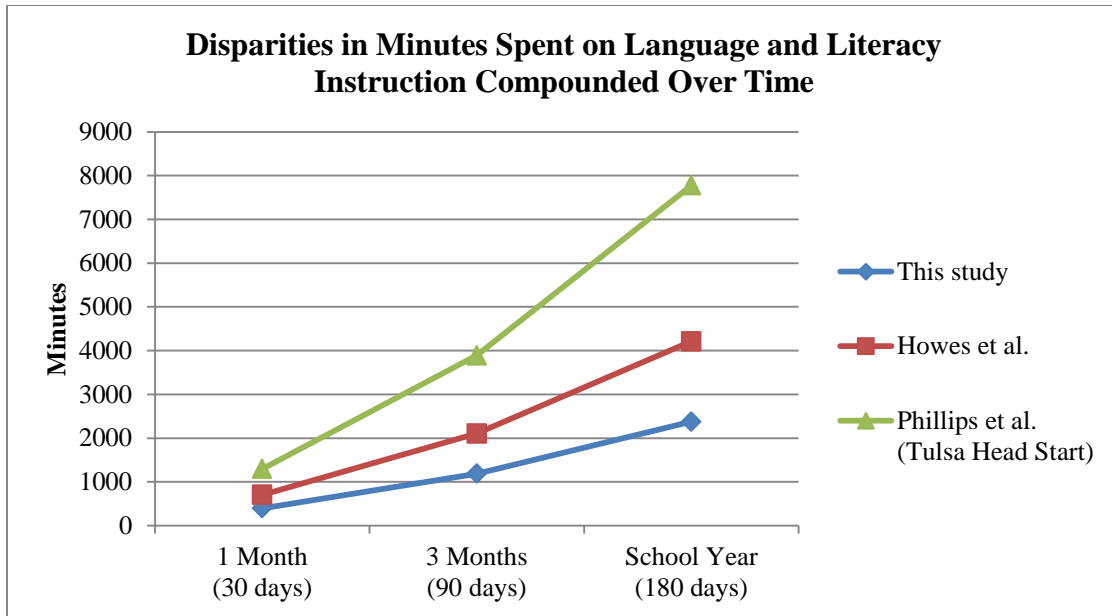
Having thoroughly investigated the time that participant GSRP teachers recalled devoting to enacted language and literacy instruction and determined that, although teacher-specific differences may exist, the experiences provided to male and female students appear to be largely comparable, I further considered the results of my primary analysis in response to research question 1. My finding that an average of 13.07 minutes of teacher-reported language and literacy instruction is provided to the average GSRP preschooler over the course of a half day suggests a rate of exposure to enacted language and literacy instruction of 4.4 minutes per hour. If accurate, this finding suggests that children in GSRP classrooms may spend less time on language and literacy than has been indicated by previous examinations of the enacted language and literacy instruction in targeted preschools. For example, Connor and colleagues reported 7.5 minutes an hour spent on literacy (Connor et al., 2006). Similarly, Howes et al. (2008) found that sampled preschoolers experienced about 7.8 minutes of literacy an hour, and Paro et al. (2009) reported that around 8.4 minutes are devoted to literacy every hour of the preschool day. My findings differ most from those of Phillips et al. (Phillips et al., 2009), who found that an average of 10.8 minutes per hour (reported by the authors as .18 of total classroom time) spent on literacy instruction in a multi-state Head Start sample, and 14.4 minutes per hour (reported as .24 of total time) spent on literacy instruction in Tulsa Head Start preschools (see Figure 3).



*Figure 3: Minutes spent on literacy instruction per hour according to extant studies*

At first glance, these discrepancies may not seem large. However, compounded over weeks and months they amount to vastly different experiences for children. For example, if GSRP children are, indeed, experiencing 4.4 minutes of language and literacy instruction per hour, then over the course of a 30-day month the average child in a half day program (3 hours of instructional time) would experience 396 minutes of language and literacy instruction. In contrast, the results of Howes et al. suggest that the average child in sampled state-funded preschools would experience 702 minutes of literacy instruction over this same 30-day period, while those of Phillips and colleagues indicate that the average child attending a Tulsa Head Start experiences 1296 minutes of literacy instruction. Over the course of a school year, these differences would be greater still (see Figure 4). And because of the clear relationship between exposure to content instruction and child learning, as well as the well-established predictive relationship between early language and literacy skills ability and reading achievement, these differences in enacted instruction rates would have very real and significant consequences for children.





*Figure 4:* Disparities in minutes spent on language and literacy compounded over time

It is therefore well worth considering the possible explanations for the discrepancies between my findings regarding the time teachers devote to language and literacy instruction and those presented in extant studies. A number of such possible explanations exist. The first set of potential explanations involves methodological differences. For example, some may suggest that differences in the definitions of language and literacy employed in these studies led to the distinct findings presented above. Indeed, the definitions used did vary. The present study, for instance, asked teachers to report on “all instruction related to reading and writing that the child in question received, including routine times and instruction that took place in another room or by another teacher”. The phrase “reading and writing” was chosen to align the question with wording often used in teacher education and curricula to describe language and literacy activities and instruction. However, teacher training ensured that participants understood that all activities related to vocabulary, oral comprehension, knowledge of letters and sounds (phonemic awareness and alphabet knowledge) and print awareness were included in this definition. In contrast, Connor and colleagues tallied the number of minutes spent on 25 language and literacy

items (including but not limited to items related to read-aloud sessions, writing, and reading comprehension). Howes and colleagues examined the extent of children's exposure to letter-sound activities, oral language activities, and being read to, using the Child Engagement section of the Emerging Academics Snapshot. Paro et al. used this same coding scheme. Finally, Phillips and colleagues used a composite measure for enacted literacy instruction that included the proportion of time spent being read to, reading, practicing letters and sounds, and building expressive language.

Each of these definitions captures a distinct set of skills and topics deemed by the authors of the study in which it was featured to be most important to, or perhaps most commonly featured in, preschool language and literacy instruction. It stands to reason that these definitions influenced the results of each author. Indeed, this supposition is supported by the very similar findings of Howes and Paro, who used the same coding scheme, about the time spent on language and literacy in sampled classrooms. However, the extent to which these varied definitions influenced these final estimates of time spent on language and literacy is unknown, and should be tested empirically in future research.

Another possible methodological explanation for the differences in my findings and those presented in extant studies is that my use of teacher logs resulted in the under-reporting of time spent on language and literacy instruction on the part of the teachers. However, concern over this possibility may be mitigated by several factors. The pilot version of the present log was found to be a reasonably valid and reliable measure of enacted preschool instruction, with analyses revealing strong exact (76% and 70%) and adjacent agreement (89% and 86%), as well as strong internal consistency on both the overall instrument and the literacy subscale ( $\alpha = .78$  and  $\alpha = .76$ ), as described above (Carpenter et al., 2007). Moreover, these findings align with other studies that

confirm the validity and reliability of very similar logs in capturing the enacted curriculum (Camburn & Barnes, 2004; Rowan et al., 2004; Rowan & Correnti, 2009). In addition, participant teachers were trained and provided with definitions for all log items. Finally, research indicates that when issues with self-reporting do arise these are more likely to involve over reporting, due to social desirability response biases (Furnham, 1986).

Despite these facts, however, it is possible that teachers did not recognize some of their language and literacy focused interactions with children as such, thereby inadvertently under reporting the enacted language and literacy instruction they provided to their students. In particular, it is possible that they did not include language and literacy instruction that was embedded within content domains like science in their estimates of time that the focal child spent on language and literacy. This possibility may be supported by the fact that, despite the small amount of time sampled teachers reportedly spent on language and literacy with their students, teachers relatively often reported using instructional strategies known to promote language learning during science instruction with the focal child. In fact, as discussed below, teachers were more likely to report using such strategies during science instruction than they were to report using instructional strategies related to letters and sounds instruction. This raises the possibility that teachers were engaged in embedded language and literacy instruction in domains like science, but, not recognizing it as such, excluded it from their estimates of time spent on language and literacy instruction with the focal child. It is similarly possible that teachers did not include language and literacy instruction and activities that occurred during free choice and play, as discussed further in Chapter 5, thereby further underselling themselves.

Despite the possibility that this sort of under-reporting occurred, it is also possible that the work of scholars in which video recording (e.g., Connor et al., 2006) or direct observation

were employed (e.g., Paro et al., 2009; Phillips et al., 2009) suffered from an observer effect, in which the presence of a researcher caused teachers to spend more time engaged in school-readiness instruction with children than they otherwise would have. Ultimately, the extent to which issues of social desirability or failure to recognize embedded language and literacy instruction as such influenced the results of this dissertation study is unknown.

A final potential explanation for the differences in findings across this body of research exists. It is arguable that the disparate results of these studies simply reflect real differences in the instruction provided in sampled classrooms. This possibility is supported by trends in the relationship between the results of each of these studies and the populations that it examines. For example, both the present study and key portions of Phillips et al.'s investigation focus in on a small number of classrooms within a single geographic area. Moreover, these studies examine particular programs across whose classrooms the same curriculum was used. The estimated time spent on literacy instruction reported in each of these studies represents an outlier in the otherwise narrow range of findings (see Figure 3).

On the other hand, the three remaining studies (by Connor et al., Paro et al., and Howes et al.) all examine a broad range of classrooms and children. Howes and Paro both led examinations of the instruction provided in a great number (700 and 730, respectively) of state-funded classrooms across the country (Howes et al., 2008; Paro et al., 2009). And although Connor Morrison and Slominski (2006) examined fewer classrooms (34), these varied a great deal. Several were targeted toward at-risk children while other fee-for-service classrooms served a more affluent group of students. Moreover, the community in which the participant children lived was extremely economically and ethnically diverse. The studies in this second set present very similar results about the time that teachers devoted to language and literacy instruction per

hour of classroom time that fall between the outlier results of the present study and Phillips et al. (see Figure 3). Given these trends, it is quite possible that the sampling decisions of Connor et al., Paro et al., and Howes et al. led to an averaging of the varied instruction offered across sampled classrooms that is reflected in their similarly moderate results. Although certainly useful in increasing generalizability and allowing for sophisticated methods of analysis such as Hierarchical Linear Modeling, such aggregation of data over large and varied populations may obscure important variations that occur from program to program and region to region.

In contrast, the distinct results presented in both the present study and key portions of the work by Phillips et al. may more distinctly reflect real geographic and curriculum-dependent differences in the instruction offered to children in attendance in those programs. For example, the results presented in this dissertation study suggest that GSRP teachers, for any number of potential reasons discussed in Chapter 5, provide their students with a smaller than average number of minutes of language and literacy instruction, in sharp contrast to programs like Tulsa's universal preschool program (Phillips et al., 2009), which is indeed renowned in its ability to improve children's language and literacy achievement (Gormley & Gayer, 2005; Gormley & Phillips, 2005; Gormley, Phillips, & Gayer, 2005; Phillips, Gormley, & Lowenstein, 2007).

Further support exists for this potential explanation for the differences between my results and those of extant studies. For example, research indicates that there is great variation in the language and literacy instruction provided to children across preschool classrooms in studies in which broad sampling methods are used (Connor et al., 2006). That time spent on literacy instruction might vary a great deal also makes intuitive sense given the influence that curricula, state standards and licensing requirements, teacher training, and even place-specific cultures of

practice may have on the instruction that children experience. Finally, it stands to reason that the needs and strengths of students attending particular programs will vary depending on a myriad of child variables such as background knowledge (Neuman, 2006), cultural and home influence on language development (Hart & Risley, 1995; Hart & Risley, 1999; Hoff-Ginsberg, 1998; Hoff, 2003, 2006; Hoff & Tian, 2005), levels of chaos and stress at home (Dumas et al., 2005; Lupien, King, Meaney, & McEwen, 2001; Turner & Avison, 2003) and even exposure to environmental toxins (Needleman & Gatsonis, 1990), all of which combine to account for the robust relationship between SES and literacy development (Aikens & Barbarin, 2008).

The diverse needs and strengths of students, in turn, prompt teachers to make different decisions about what content to focus on in their classrooms. These decisions are then influenced by program- and place-specific difference in the quality of teaching training programs, the availability of classroom resources, etc. In particular, research supports the notion of SES-related differences in the language and literacy instruction provided in early childhood classrooms. For example, Wright suggests that teachers serving in low-SES classrooms provided fewer word explanations than those serving wealthier children (Wright, 2011). Similarly, work by Duke reveals that first grade classrooms in low-SES districts contain fewer informational texts, and that teachers in these rooms spend significantly less time with such texts (Duke, 2000). In short, there is evidence to support the hypothesis that differences in sampling explain the disparate findings of the present study and similar extant research. This highlights the value of providing deep and accurate examinations of the enacted curriculum in specific programs, as I have done in this dissertation study.

In sum, my results in response to research question 1 suggest that teachers may spend very little time on language and literacy instruction with the average at-risk child in their

classroom (although my findings do suggest some significant variation from teacher to teacher and may additionally be influenced by issues of under-reporting). Additional comparative analyses indicate that this is likely the case regardless of whether the child in question is male or female. Finally, the hourly rate of enacted instruction resulting from my analysis stands in contrast to rates described in extant studies, arguably indicating that GSRP teachers provide children with smaller than average doses of vital language and literacy instruction, or, alternatively, that the respondents narrowly construed the question. I further discuss this possibility in Chapter 5.

### **Research Question 2: Which Literacy Skills Are Most Commonly Taught in Preschools Targeting At-risk Children?**

My analysis continued with an investigation of the key language and literacy skills that were most commonly taught to the at-risk children attending sampled GSRP preschools. The data upon which my analysis for this question relied were collected in the portion of the teacher log asking teachers about their focus on four key language and literacy skills with that day's target child. These skills were vocabulary, comprehension, print awareness, and letters and sounds. In each case, teachers were asked: "How much did you focus on [LITERACY SKILL] with [NAME OF FOCAL CHILD] today?" And in each case, four teacher responses were possible: "a lot," "a little," "touched on briefly," and "not at all." These responses were then rated on a 4-point Likert-type scale, with "a lot" coded as 1, "a little" coded as 2, etc.

Having thus coded teacher responses to these four log items, I aggregated teacher responses for each language and literacy skill. I then calculated both the median and mode Likert-scale response for each skill. A comparison of these median and mode teacher responses regarding their focus on vocabulary, comprehension, print awareness, and letters and sounds instruction provided an initial understanding of how teachers prioritized instruction across these

important topics during the 13.4 minutes of enacted language and literacy instruction that they provide to their average student.

My results suggest that, of the four key literacy skills examined in this study, teachers recall most often providing vocabulary instruction to the students in their classroom (see Table 4 below). Both the median and mode responses for vocabulary instruction indicate that teachers most often reported focusing “a little” on vocabulary with the child in question.

Table 4: *Median and mode of teacher focus on literacy skills (n= 192; listwise deletion of missing data)*

| <b>Literacy Skill</b> | <b>Median</b> | <b>Mode</b> |
|-----------------------|---------------|-------------|
| Vocabulary            | 2             | 2           |
| Oral Comprehension    | 3             | 2/3         |
| Print Awareness       | 3             | 4           |
| Letters and Sounds    | 2             | 4           |

*Note.* Likert-scale responses coded such that “a lot” = 1, “a little,” = 2, “touched on briefly” = 3, and “not at all” = 4.

My results indicate that, in comparison, the remaining three key language and literacy skills were reportedly less often taught in sampled GSRP classrooms. The median Likert-type teacher response regarding focus on oral comprehension with their at-risk students suggests that, on average, teachers reported touching on that skill briefly with their students. However, the *mode* response for oral comprehension indicates that teachers most often reported both instructing on that skill “a little” and “touching on it briefly” with the children in their classroom (e.g., descriptive statistics revealed mode responses of both 2 and 3). Considering the results for print awareness, the median response of 3 indicates that, on average, teachers recalled touching on that skill briefly with their students. However, the mode result of 4 reveals that, when reflecting on their print awareness instruction, teachers most often reported not instructing on that literacy skill. Finally, a median of 2 indicates that, on average, teachers reported instructing “a little” on



letters and sounds with their students. Interestingly, however, the most common response teachers gave about their instruction in this area was that they did not provide any instruction to that day's focal child.

Stepping back, these results reveal little clear difference in the extent to which teachers provided oral comprehension, print awareness, and letters and sounds instruction to their students. It is possible that letters and sounds may be the next most commonly taught language and literacy skill in sampled classrooms, with a median response of 2 indicating that, on average, teachers recalled providing "a little" instruction on this literacy skill with their students. However, as noted above, the mode response on this item was 4, casting doubt on this inference. It is also possible, given the results described above, that teachers are *least* likely to instruct on print awareness with their at-risk students (Median = 3, Mode = 4). In the end, however, it is not clear whether an appreciable difference exists between teacher tendency to teach oral comprehension, letters and sounds, and print awareness to their at-risk preschoolers.

Because the results presented in Table 4 arguably suggest a tendency on the part of teachers to focus on vocabulary instruction over the remaining language and literacy skills, I created a correlation matrix to further explore this possibility. A comparison of the correlations of teacher focus across language and literacy skills provides a very basic initial indication of teachers' beliefs about which skills ought to be focused on. High correlations across all four skills would provide some potential indication that teachers evenly distribute focus of instruction across these skills. In contrast, should vocabulary be less strongly correlated with the others, this would preliminarily suggest the possibility that teachers deem this skill to be of particular importance, and place a disproportionate amount of focus on it. The results of my correlation matrix can be seen in Table 5.

Table 5: Results of a correlation matrix of teacher focus on vocabulary, oral comprehension, print awareness, and letters and sounds during language and literacy instruction (n= 192; listwise deletion of missing data)

|                             | Focus on vocabulary | Focus on oral comprehension | Focus on print awareness |
|-----------------------------|---------------------|-----------------------------|--------------------------|
| Focus on oral comprehension | .468***             | --                          | --                       |
| Focus on print awareness    | .225**              | .300***                     | --                       |
| Focus on letters and sounds | .045                | .198**                      | .500***                  |

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

They suggest several things. First, they reveal predominantly statistically significant correlations, ranging from  $p < 0.01$  to  $p < 0.0001$ . Only the correlation between vocabulary and letters and sounds instruction was not statistically significant. My results also suggest positive correlations of teacher focus across all four skills. Thus, it seems likely that the greater the teacher-reported focus on one skill, the more they reportedly tended to focus on the remaining three skills. This paints a picture of classroom in which, when they increase time spent on language and literacy with a certain child, teachers are likely to increase their focus across skills. Put differently, it suggests that teacher focus on a certain skill did not tend to systematically result in decreased tendency to focus on other skills.

Interestingly, however, teacher reports of the extent to which they focused on these skills were not very strongly correlated with each other. Categorizing the correlation coefficients such that  $r$  values of +0.30 indicate a “weak” positive linear relationship, values of +0.50 indicate a “moderate” positive relationship, and values of +0.70 indicate a positive linear relationship that is “strong” aids in discussion of my exploratory findings. The strongest correlation of .500 (between teacher focus on print awareness and on letters and sounds instruction) can thus be deemed “moderate”, whereas the correlation between vocabulary and oral language

comprehension (.468) falls just short inside the “weak” category. Similarly, the correlation between oral comprehension and print awareness (.300) may be categorized as “weak”. In contrast, my results suggest that there was only little positive correlation between teacher focus on vocabulary and print awareness (.225) and on comprehension and letters and sounds (.198).

Patterns emerging from these results arguably make intuitive sense. Thinking about both the interrelated nature of the four language and literacy skills examined in this study and patterns of instruction that tend to occur around common preschool activities, it is arguably unsurprising, for example, that teachers who place a great focus on print awareness with a given child one day (say through encouraging a child to include her name on a piece of artwork or working with labels and signs during circle time) are also likely to focus on letters and sounds instruction. Similarly, it arguably makes intuitive sense that teacher focus on vocabulary development may occur during an oral comprehension activity. For example, teachers are likely to embed vocabulary instruction within conversations about the meaning of text in a book read aloud during circle time, or the meaning of a novel word used in context during a science experiment. It also arguably unsurprising that teacher focus on oral comprehension is only weakly correlated with focus on letters and sounds instruction; it is less easy to imagine a typical preschool activity that naturally lends itself to the simultaneous development of these two skills.

Stepping back and looking across the four language and literacy skills examined in this dissertation, however, no pattern of correlation emerges that would support the hypothesis that teachers favor vocabulary instruction over the other language and literacy skills examined in this dissertation study. Rather, it appears that the correlations, while positive and largely statistically significant, range from “moderate” to very weakly correlated in ways that suggest possible patterns of instruction related to the tendency of teachers to teach on closely related skills around

a single activity. This initial exploratory finding must be followed up in future research that more clearly examines such patterns.

In sum, my initial analysis in response to research question 2 suggests a possible tendency on the part of GSRP teachers to teach vocabulary over oral comprehension, print awareness, and letters and sounds, and little other prioritization of the remaining language and literacy skills. A subsequent correlation matrix does not further support this hypothesis, rather indicating statistically significant moderate to very weak positive correlations across all four language and literacy skills and possible patterns of instruction between skills like vocabulary knowledge and oral comprehension. These findings demonstrate the need for further investigation into the nature of the 13.4 minutes of language and literacy instruction provided by teachers to their at-risk students, on average.

### **Research Question 3: To What Extent Do Teachers Focus on Key Literacy Skills and Relevant Instructional Strategies in Preschools Targeting At-risk Children?**

Having revealed the time that teachers spend on language and literacy instruction with their average at-risk student, the possibility that teachers may prioritize vocabulary instruction during this time, and some basic potential patterns in teachers' tendency to provide focused instruction across the four language and literacy skills examined in this study, I sought to further understand the nature of the enacted language and literacy instruction provided to GSRP children in participating classrooms. Specifically, I asked "to what extent do teachers focus on key literacy skills and relevant instructional strategies in preschool targeting at-risk children?"

#### **Literacy Skills**

To address this question, I began by taking a closer look at the log items reflecting the extent to which teachers focused on vocabulary, oral comprehension, print awareness, and letters and sounds with the focal students in their classrooms. Rather than considering the median and

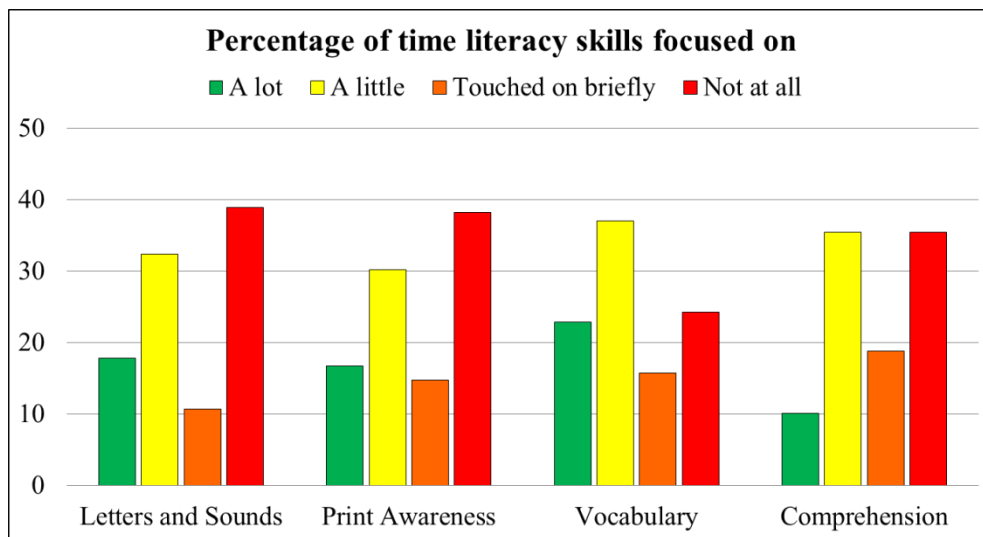
mode responses for these items, as I did in addressing research question 1, I instead considered the precise distribution of teacher responses across the four Likert-type scale options for each literacy skill (see Table 6).

Table 6: *Extent of teacher focus on literacy skills*  
(*n= 192; listwise deletion of missing data*)

| <b>Literacy Skill</b> | <b>Extent of Focus</b> | <b>Percent</b> |
|-----------------------|------------------------|----------------|
| Vocabulary            | A lot                  | 22.85%         |
|                       | A little               | 37.03%         |
|                       | Touched on briefly     | 15.81%         |
|                       | Not at all             | 24.29%         |
| Oral Comprehension    | A lot                  | 10.10%         |
|                       | A little               | 35.51%         |
|                       | Touched on briefly     | 18.88%         |
|                       | Not at all             | 35.51%         |
| Print Awareness       | A lot                  | 16.73%         |
|                       | A little               | 30.20%         |
|                       | Touched on briefly     | 14.80%         |
|                       | Not at all             | 38.27%         |
| Letters and Sounds    | A lot                  | 17.86%         |
|                       | A little               | 32.45%         |
|                       | Touched on briefly     | 10.71%         |
|                       | Not at all             | 38.98%         |

Echoing the analysis presented in response to research question 2, these results suggest an importance placed on vocabulary instruction; of the four language and literacy skills, sampled teachers were most likely to report focusing “a lot” on vocabulary, choosing this option to describe their vocabulary instruction with that day’s focal child 22.85% of the time. In comparison, oral comprehension was focused on “a lot” with the focal child only 10.10% of the time, print awareness 16.73% of the time, and letters and sounds instruction focused on “a lot 17.86% of the time.

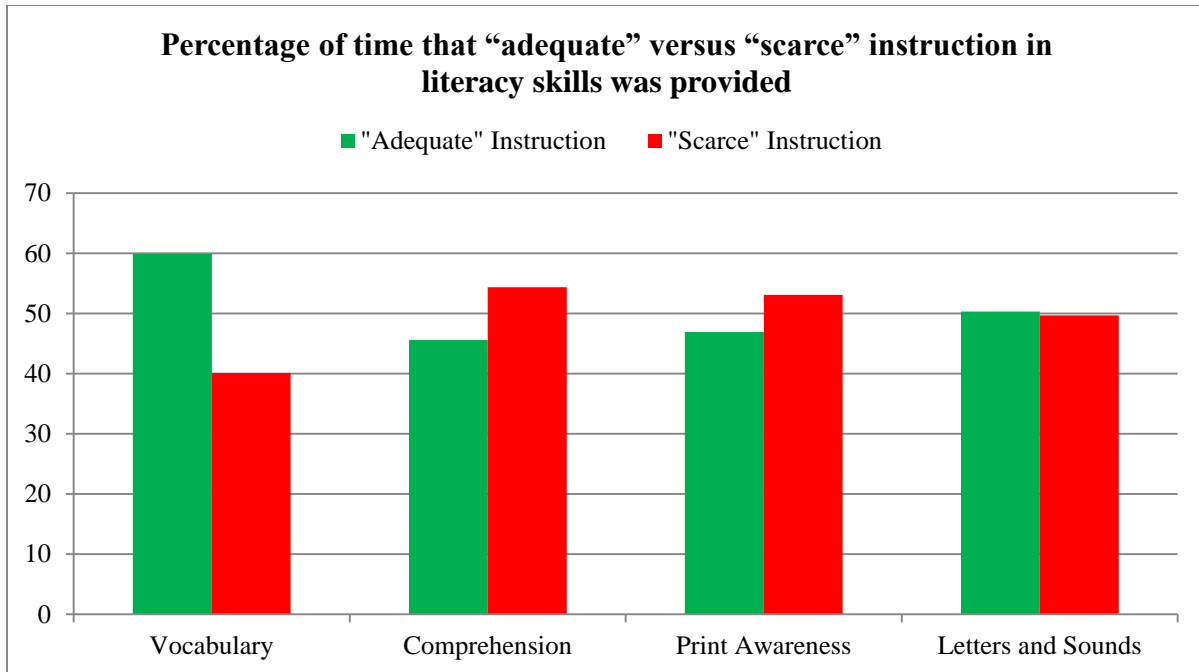
Considering the percentage of time that teachers reported “not at all” instructing on these key literacy skills is also helpful in painting a portrait of the enacted language and literacy instruction provided in sampled GSRP preschools. In other words, it is informative to determine which skill is most likely to be overlooked during enacted language and literacy instruction in these preschools. When the results are considered in this way, vocabulary instruction again stands out from the other skills. Of the four key language and literacy skills, vocabulary was the least likely to be overlooked, with teachers reporting that this skill was “not at all” a focus of instruction with the focal child 24.29% of the time. In comparison, letters and sounds, print awareness, and oral comprehension were more often overlooked during enacted language and literacy instruction with participant at-risk preschoolers (“not at all” a focus of instruction 38.98%, 38.27%, and 35.51% of the time, respectively). Figure 5 provides a useful visual comparison of these results.



*Figure 5: Percentage of time that teachers focused on literacy skills with children*

A third informative way to consider teachers’ possible distribution of focus across literacy skills is to compare the percentage of time in which teachers reported focusing on it

either “a lot” or “a little,” as opposed to either touching on the skill briefly or not teaching it at all -- in other words, to collapse the four-scale Likert responses into two. These new binary outcome variables, then, could be described as roughly representing “adequate” and “scarce” instruction. When considered in this way, vocabulary remains the most focused on, with results indicating that it was taught at least “a little” to focal children 59.88% of the time (see Figure 6). Letters and sounds was the next most focused on, being taught at least “a little” 50.31% of the time. Thus, focal children were about as likely to experience what might be considered “adequate” instruction in letters and sounds as they were to receive “scarce” instruction. Of the four key language and literacy skills focused on in this dissertation, teachers were next most likely to report teaching print awareness to focal children at least “a little”, with results suggesting they did so 46.93% of the time. Oral comprehension was least focused on when these new binary outcomes were considered, with teachers reporting that they instructed on that skill at least “a little” with focal children 45.61% of the time. Thus, the average GSRPS child in sampled classrooms was more likely than not to experience only scarce instruction in both print awareness and comprehension.



*Figure 6:* Percentage of time that “adequate” versus “scarce” instruction in key language and literacy skills was provided to students in sampled GSRP classrooms

Clear trends in the data become apparent when these multiple ways of considering the data are employed. Significantly, all three methods suggest that participant teachers may focus the most on vocabulary with their at-risk students. Each method also arguably confirms that letters and sounds instruction is next most likely to be featured by sampled teachers, followed by print awareness. All three methods also raise the possibility that oral comprehension is the language and literacy skill least likely to a focus of instruction provided to focal children in sampled GSRP classrooms.

A complete interpretation of these results must also include a consideration of what these figures actually mean for the children attending sampled GSRP classrooms. One can envision the following illustrative scenario about letters and sounds instruction, for example. Based on teacher recollection, that topic was a focus of instruction with the child in question roughly 20% of the time, taught “a little” around 30% of the time, “touched on briefly” about 10% of the time,



and “not at all” instructed the remaining approximately 40% of the time (see Table 6 above). For the sake of concretizing these descriptive figures, it is useful to translate them into a 5-day school week, with a 20% rate of instruction being equal to one school day. Over the course of a week, then, letters and sounds might be a focus of instruction with the average child on Monday. The topic might then be instructed on “a little” on Tuesday and half of Wednesday (equal to 30% of the 5-day week), “touched on briefly” with that child for the rest of Wednesday (10% of the 5-day week), and then not taught at all on Thursday and Friday. Compounded over time, then, the average participant preschooler would not receive any instruction on letters and the sounds that they make for 57 out of the 150 school days provided to GSRP children. In fact, my results suggest that letters and sounds may be a focus of instruction with the average child on only 27 school days per year. This arguably amounts to a great missed opportunity for instruction in this skill, especially considering the major role that it plays in aiding in the development of reading.

Applying this method of concretizing my descriptive findings to the remaining language and literacy skills, my data suggest that the number of school days in which the average GSRP student will not be at all exposed to print awareness instruction is also approximately 57. For comprehension, my data suggest there will be 53 school days of what can arguably be framed as missed opportunity for instruction. The figure for vocabulary amounts to an average potential loss of 36 school days of instruction. It is important to note, as well, that these figures do not include the many days on which instruction was merely “touched on” with the focal child. If, however, one argues that “touching on” letter and sounds instruction is insufficient to narrow the achievement gap in this area then the children attending sampled GSRP classrooms are missing what could be construed as a full 73 days of “sufficient” instruction over the school year.

Finally, when interpreting these results it must be stressed that children like those in attendance at GSRP preschools, who tend to come from impoverished backgrounds, are typically less likely to experience either explicit instruction or exposure to literacy-enhancing activities at home (e.g., Hart & Risley, 1995). Thus, children attending targeted preschools who, for example, aren't exposed to letters and sounds instruction during summers, vacations, and weekends, may experience said instruction on as few as 77 days per year. For such children, then, the arguable actual lost opportunity for letters and sounds instruction may be equal to as much as 288 days a year. While this scenario certainly does not hold true for *all* children in sampled classrooms, it clearly demonstrates the real-world potential cost of the lost opportunities detailed above to children attending targeted programs like Michigan's GSRP preschools.

### **Instructional Strategies**

Thus far, my analyses in response to research question 3 have provided an initial understanding of the extent to which participant teachers focused on vocabulary, oral comprehension, print awareness, and letters and sounds with their students, as well as an understanding of what my findings may mean for GSRP children when translated into real-world scenarios. However, a complete understanding of the day-to-day enacted language and literacy instruction provided in GSPR classrooms also requires consideration of the related instructional strategies and practices reportedly used by teachers.

A fair amount of consensus exists about the basic research-based instructional strategies that aid in imparting literacy-specific knowledge in preschool settings. Those included in the present teacher log to describe the instruction provided in the areas of vocabulary, oral comprehension, print awareness, and letters and sounds align with this consensus, and are typical of preschool instruction in a program that uses a research-based curriculum. For example, in the

present log participant teachers were asked to report on their use of the following strategies during letters and sounds instruction with that day's focal child: identified letter sounds, identified letter names, identified alliteration, identified rhymes, blended sounds into words, and broke words into sounds. These strategies aid children in learning the letters of the alphabet and making the explicit link between letters and the sounds that they make. This, in turn, facilitates the use of letter-sound knowledge to decode written words.

Agreement about the effectiveness of these strategies during preschool letters and sounds instruction is fairly widespread. For example, the What Works Clearinghouse (WWC), an initiative of the U.S. Department of Education's Institute of Education Sciences (IES), states that letters and sounds instruction ought to be systematic, explicit, and integrated into daily activities. The WWC recommends that teachers use clear pronunciation of sounds and provide feedback to correct children's spoken errors, and direct phonological awareness instruction in conjunction with letter knowledge training. Specifically, training activities that focus on teaching children to identify, detect, delete, segment, or blend segments of spoken words (i.e., words, syllables, onsets and rimes, phonemes), or that focus on teaching children to detect, identify, or produce rhyme or alliteration are recommended (What Works Clearinghouse, 2011).

The instructional strategy items in the present log also align with recommendations included in Michigan's Early Childhood Standards of Quality for Prekindergarten (ECSQ-PK) (Michigan State Board of Education, 2005). Indeed, the ECSQ-PK advise the use of such instructional strategies, referred to as "quality teaching strategies," for the instruction of letters and sounds. For example, the ECSQ-PK direct GSRP teachers to accept children's invented spelling, and take opportunities to provide explicit instruction on the alphabetic principle, letter-sound relationships and environmental print (p. 37). The ECSQ-PK also state that teacher ought

to facilitate children's exploration of writing and labeling in all areas of the classroom (p. 123), and incorporate language experiences into children's daily activities (p. 124). As a result of strategies like these, the ECSQ-PK explain, children ought to exhibit emerging early learning indicators surrounding letters and sound knowledge. These include showing progress in identifying and associating letters with their names and sounds, recognizing some personally meaningful words, participating in experimentation and play with sounds (e.g., rhyming games), and making progress toward phonetic and conventional spelling (p. 31). In short, the instructional strategies included in the present teacher log are typical of preschool early literacy instruction and align closely with the strategies promoted by leading organizations like the WWC and the standards to which the GSRP program itself adheres. Therefore, one would arguably expect to see each of the strategies in use in GSRP classrooms.

However, trends in the use of specific strategies across key literacy skills instruction have, to my knowledge, never before been considered. I therefore sought to address this knowledge gap and reveal participant teachers' instructional strategy use related to their instantiated vocabulary, oral comprehension, print awareness, and letters and sounds instruction in sampled classrooms. To accomplish this, I first aggregated teacher responses to a series of checklists about their recollected use of instructional strategies during language and literacy skills instruction with that day's focal child. My result provide a summary picture, then, of the percentage of time that each instructional strategy was reported as "a focus of instruction" with the focal student, the percentage of time that teachers reported touching on each strategy briefly, and the percentage of time that teachers reported not at all using that instructional strategy. I then compared teacher responses within and across key language and literacy skills.

Consistent with the above results indicating that teachers may slightly emphasize vocabulary instruction, my findings suggest that instructional strategies for increasing children's vocabulary knowledge were the most often featured in sampled classrooms, according to teacher report. Results for specific vocabulary instructional strategies, which can be found in Table 7, indicate that participant teachers either touched on or focused on vocabulary instructional strategies with children between about 25% and 75% of the time. The most commonly used instructional strategy employed by teachers to teach vocabulary was introducing new words through book reading ("learned new words in books"). While filling out the instructional log, teachers recalled that this strategy was a focus of their vocabulary instruction with the child in question 36.02% of the time, and was a strategy they touched on 38.67% of the time. According to teacher report, only about 1 in 4 focal children (25.31%) did not at all experience this instructional strategy over the course of that day's enacted language and literacy instruction. In contrast, teachers relatively rarely reported intentionally using the different form of a word with the focal child. This strategy was apparently a focus of instruction only 7.14% of the time, and was touched on briefly 17.65% of the time. Three of four focal children (75.20%) did not experience this instructional strategy over the course of the day's instantiated language and literacy instruction, according to teacher report. The results of the remaining vocabulary instructional strategies fell between these two (see Table 7), although it is worth noting that teachers indicated that the strategy most likely to be overlooked with the child in question was sorting words into categories; 79.69% of the time, teachers did not recall employing this strategy with the focal child.

*Table 7: Extent of teacher focus on vocabulary instructional strategies  
(n= 192; listwise deletion of missing data)*

| <b>Instructional Strategy</b>   | <b>Extent of Focus</b> | <b>Percentage</b> |
|---------------------------------|------------------------|-------------------|
| Learned new words in books      | A focus of instruction | 36.02%            |
|                                 | Touched on briefly     | 38.67%            |
|                                 | Not instructed         | 25.31%            |
| Used different forms of word    | A focus of instruction | 7.14%             |
|                                 | Touched on briefly     | 17.65%            |
|                                 | Not instructed         | 75.20%            |
| Focused on meaning of new words | A focus of instruction | 32.24%            |
|                                 | Touched on briefly     | 33.78%            |
|                                 | Not instructed         | 33.98%            |
| Sorted words into categories    | A focus of instruction | 9.18%             |
|                                 | Touched on briefly     | 11.12%            |
|                                 | Not instructed         | 79.69%            |
| Used new words to discuss topic | A focus of instruction | 30.92%            |
|                                 | Touched on briefly     | 31.02%            |
|                                 | Not instructed         | 38.06%            |

In comparison, instructional strategies in oral comprehension were apparently less likely to be used in sampled classrooms. Teachers indicated that strategies related to this language and literacy skill were at least touched on briefly with sampled children between about 38% and 55% of the time (see Table 8). The instructional strategy most often employed with focal children was activating their prior knowledge, with teachers reporting that this strategy was a focus of instruction 15.36% of the time, touched on briefly 40.14% of the time, and not employed at all 44.50% of the time. The strategy possibly used least often was the retelling of stories. Teachers reported using this strategy as a focus of instruction only 5.10% of the time, touching on it briefly 33.05% of the time, and not using it at all 61.85% of the time. My results also suggest that the instructional practices related to oral comprehension that were most likely to be

overlooked; related strategies were not at all used with focal children between 44.50% (activating prior knowledge) and 61.85% (retold stories) of the time. It is worth noting that even the strategy that was reportedly *least likely* to be omitted by GSRP teachers (activating prior knowledge) was allegedly only experienced by a little over half of the children in participating classrooms on a given day.

*Table 8: Extent of teacher focus on oral comprehension instructional strategies (n= 192; listwise deletion of missing data)*

| <b>Instructional Strategy</b>     | <b>Extent of Focus</b> | <b>Percentage</b> |
|-----------------------------------|------------------------|-------------------|
| Activated prior knowledge, etc.   | A focus of instruction | 15.36%            |
|                                   | Touched on briefly     | 40.14%            |
|                                   | Not instructed         | 44.50%            |
| Made predictions, previewed, etc. | A focus of instruction | 8.67%             |
|                                   | Touched on briefly     | 37.64%            |
|                                   | Not instructed         | 53.68%            |
| Retold stories                    | A focus of instruction | 5.10%             |
|                                   | Touched on briefly     | 33.05%            |
|                                   | Not instructed         | 61.85%            |
| Compared/contrasted information   | A focus of instruction | 16.33%            |
|                                   | Touched on briefly     | 29.48%            |
|                                   | Not instructed         | 54.20%            |

In the case of print awareness, my examination of key instructional strategies paints a similar picture. Speaking broadly, my results suggest that these research-based and broadly recommended strategies were employed less often than were strategies related to vocabulary instruction but about as often as those related to oral comprehension. Print awareness instructional strategies were reportedly used with the focal child (e.g., at least touched on briefly) between 48.47% (pointed out familiar print) and 38.77% (followed print from left to right) of the time (see Table 9). Put differently, teachers recalled that these three strategies were not at all used by participant teachers with the focal child between 51.53% (pointing out familiar print)

and 61.22% (followed print from left to right finger) of the time. Thus, the strategy *most likely* to be used to teach print awareness with GSRP preschoolers (pointed out familiar print) was possibly only employed with about half of the children in attendance in these classrooms on a given day, and may have been a focus of instruction only 14.19% of the time.

*Table 9: Extent of teacher focus on print awareness instructional strategies (n= 192; listwise deletion of missing data)*

| <b>Instructional Strategy</b> | <b>Extent of Focus</b> | <b>Percentage</b> |
|-------------------------------|------------------------|-------------------|
| Pointed out familiar print    | A focus of instruction | 14.29%            |
|                               | Touched on briefly     | 34.18%            |
|                               | Not instructed         | 51.53%            |
| Connected pictures and print  | A focus of instruction | 17.76%            |
|                               | Touched on briefly     | 28.16%            |
|                               | Not instructed         | 54.08%            |
| Followed print left to right  | A focus of instruction | 9.69%             |
|                               | Touched on briefly     | 29.08%            |
|                               | Not instructed         | 61.22%            |

Of the four key language and literacy skills, strategy use during letters and sounds instruction was arguably the least likely to occur. The identification of both letter names and sounds was reported as an employed instructional strategy (e.g., at least touched on briefly) just over 50% of the time, in contrast to blending (4.59% ) and breaking (10.20%) words, and identifying rhymes (17.96%) and alliterations (25.61%) (see Table 11). Put differently, teachers did not recall using letters and sounds instructional strategies during instruction between 44.59% (identified letter names) and 95.41% (blending) of the time. In particular, breaking, blending, and the identification of rhymes, although all shown to promote phonological awareness, which then predicts reading ability (National Early Literacy Panel, 2009), were very rarely used with focal children in sampled GSRP classrooms, according to teacher reports.



*Table 10: Extent of teacher focus on letters and sounds instructional strategies (n= 192; listwise deletion of missing data)*

| <b>Instructional Strategy</b> | <b>Extent of Focus</b> | <b>Percent</b> |
|-------------------------------|------------------------|----------------|
| Identified letter sounds      | A focus of instruction | 22.35%         |
|                               | Touched on briefly     | 29.49%         |
|                               | Not instructed         | 48.16%         |
| Identified letter names       | A focus of instruction | 27.45%         |
|                               | Touched on briefly     | 27.96%         |
|                               | Not instructed         | 44.59%         |
| Identified alliteration       | A focus of instruction | 8.67%          |
|                               | Touched on briefly     | 16.94%         |
|                               | Not instructed         | 74.39%         |
| Identified rhymes             | A focus of instruction | 5.10%          |
|                               | Touched on briefly     | 12.86%         |
|                               | Not instructed         | 82.04%         |
| Blended sounds into words     | A focus of instruction | 0.51%          |
|                               | Touched on briefly     | 4.08%          |
|                               | Not instructed         | 95.41%         |
| Broke words into sounds       | A focus of instruction | 3.06%          |
|                               | Touched on briefly     | 7.14%          |
|                               | Not instructed         | 89.80%         |

While Tables 7 through 10 provide all the information that is strictly necessary to address this portion of research question 3, these figures do not signify much without an understanding of what they may mean over time and within the context of the life of the at-risk child. This can be accomplished by once again translating teacher response rates from percentages into days over a 5-day school week, with one day equal to a 20% response rate. For example, teacher reports indicate that blending sounds into words may not be instructed on at all with the average child for 141 days of the 150-day GSRP school year, and may be a focus of instruction with the average child for less than one day. This statistic is admittedly the most extreme among all literacy skills instructional strategies considered in the present study. However, considering the

far-reaching impacts of reading ability and the plight of at-risk preschoolers, even the statistics connected to the instructional strategies reported to be *most often* employed are arguably problematic. Take, for example, learning new words in a book, the language and literacy instructional strategy teachers most often reported using with their preschoolers. Teacher responses indicate that the average GSRP child will receive vocabulary instruction in which learning new words in books was a focus of instruction for a little under two days of a given week (36% of the time). However, this still means that approximately 2 additional days a week (39% of the time) teachers may merely briefly touch on this strategy for vocabulary instruction. The final day-plus of the week, my results suggest, the average GSRP child may not receive any instruction in which new words were pointed out and defined in a book. Given that targeted programs like the GSRP were designed to increase school readiness and particularly emphasize language and literacy instruction, such suggestive statistics are troubling.

Before moving on to research question 4, I conducted two final analyses that provide a slightly different understanding of teachers' potential use of instructional strategies across these four language and literacy skills. In order to both further facilitate comparisons of teacher-reported strategy use across language and literacy skills and enable later comparisons to strategies used during science instruction; I transformed teacher responses such that they were binary variables indicating simply whether or not teachers employed each instructional strategy. These figures are included in Table 11, below.

*Table 11: Percentage of the time teachers used instructional strategies during literacy skills instruction (n= 192; listwise deletion of missing data)*

| <b>Literacy Skill</b> | <b>Instructional Strategy</b>     | <b>Percent</b> |
|-----------------------|-----------------------------------|----------------|
| Vocabulary            | Learned new words in books        | 74.69%         |
|                       | Used different forms of word      | 24.80%         |
|                       | Focused on meaning of new words   | 66.02%         |
|                       | Sorted words into categories      | 20.31%         |
|                       | Used new words to discuss topic   | 61.94%         |
| Oral Comprehension    | Activated prior knowledge, etc.   | 55.5%          |
|                       | Made predictions, previewed, etc. | 46.32%         |
|                       | Retold stories                    | 38.15%         |
|                       | Compared/contrasted information   | 45.80%         |
| Print Awareness       | Pointed out familiar print        | 48.47%         |
|                       | Connected pictures and print      | 45.92%         |
|                       | Followed print left to right      | 38.78%         |
| Letters and Sounds    | Identified letter sounds          | 51.84%         |
|                       | Identified letter names           | 55.41%         |
|                       | Identified alliteration           | 25.61%         |
|                       | Identified rhymes                 | 17.96%         |
|                       | Blended sounds into words         | 4.59%          |
|                       | Broke words into sounds           | 10.20%         |

I then collapsed these results yet further, aggregating teacher responses for all strategies related to each language and literacy skill. In other words, I created a composite measure for each language and literacy skill representing the average extent to which instructional strategies related to that skill were employed. A visual comparison of these aggregate figures provides a basic understanding of teachers' reported tendency to use instructional strategies across vocabulary, oral comprehension, print awareness, and letters and sounds instruction (see Figure

7). The results of both of these additional analyses arguably further confirm teachers' focus on vocabulary skills instruction; compared with the other language and literacy skills, their instruction in this area appeared to be particularly strategy-rich. They also arguably highlight teachers' tendency not to use the research-based instructional strategies examined in this dissertation study to teach their preschoolers about letters and sounds.

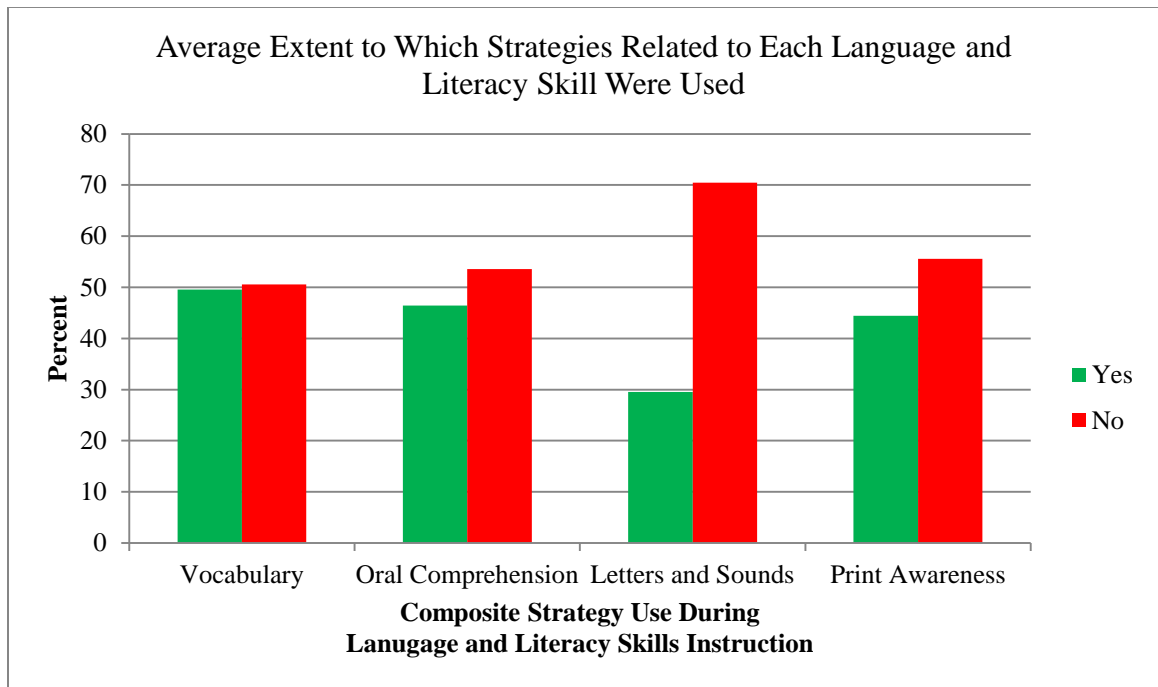


Figure 7: Average extent to which teachers used strategies related to key language and literacy skills

In sum, all analyses conducted to determine the extent to which sampled GSRP teachers focused on key literacy skills suggested a relative privileging of vocabulary instruction. This finding was potentially further supported by results suggesting the vocabulary instruction provided to sampled children was more likely to be strategy-rich than was instruction in other language and literacy skills. My results also suggest that GSRP teachers may be *least* likely to focus on oral comprehension with their at-risk students. Interestingly, however, my analyses also suggest that it was teachers' instruction in letters and sounds that was the most strategy-scarce,

despite the important role that phonological awareness and alphabetic knowledge play in supporting children's early reading ability (National Early Literacy Panel, 2009). Although, as discussed in Chapter 5, a number of structural factors may well be to blame, these results paint an initial portrait of what could be framed as missed opportunity when it comes to teachers' tendency to focus on key language and literacy skills and employ research-based and GSRP-endorsed instructional strategies – arguably even in the case of the relatively featured vocabulary instruction.

**Research Question 4: Within the Content Domain of Science, What Instructional Strategies that are Related to Language and Literacy Development do Teachers Employ, and which are Most Commonly Used?**

Having presented results regarding the time spent on language and literacy instruction with at-risk children in sampled classrooms, as well as the topics and instructional strategies that teachers recalled covering during that instruction, I sought to understand teachers' use of instructional strategies related to language and literacy development within content domains. In particular, given the previously-discussed strong connections between science learning and language development, an examination of the instructional strategies related to language and literacy development that teachers embedded within science instruction was relevant.

Four such common and effective strategies were included in the teacher log. The first, making real world observations with children, is a practice that, among other things, promotes vocabulary, verbal fluency and knowledge development. These, in turn, foster oral comprehension, as well as later comprehension of decoded text. The remaining three strategies (identifying the properties of an object, explaining why predictions are correct or incorrect, and helping the child conduct a hands-on experiment) similarly benefit children's language

development through the introduction of sophisticated vocabulary words used in context and increased linguistic demands on both teacher and child.

To paint an initial portrait of teacher’s use of these four strategies during their science instruction with their at-risk students, I aggregated log responses indicating whether or not each strategy was reportedly employed with that day’s focal child. I then compared results across these strategies. My results reveal that, in sampled classrooms, teachers most often reported making real world observations with the focus child; participants reported using this strategy with 71.51% of focal children (see Table 12).

*Table 12: Frequency of instructional strategies used to teach science  
(n= 186; listwise deletion of missing data)*

| <b>Instructional Strategy</b>     | <b>Frequency</b> | <b>Percent</b> |
|-----------------------------------|------------------|----------------|
| Identified properties of object   | 75               | 40.32%         |
| Explained accuracy of predictions | 70               | 37.63%         |
| Made real world observations      | 133              | 71.51%         |
| Helped with hands-on experiment   | 34               | 18.28%         |
| None of the above                 | 14               | 7.53%          |

The next most commonly employed strategy was arguably the identification of properties of an object (“the shape, texture, and/or hardness of an object”), with 40.32% of teachers reporting using the strategy with the focal child. Teachers were next most likely to recall explaining why predictions are correct or incorrect (37.63%), but were reportedly less likely help the focal child conduct a hands-on experiment (18.28%). Only 7.53% of teachers reported not using any of listed instructional strategies examined in this dissertation. A visual comparison of these teachers response rates aids in clearly portraying the relative frequency with which they were used. (See Figure 8).

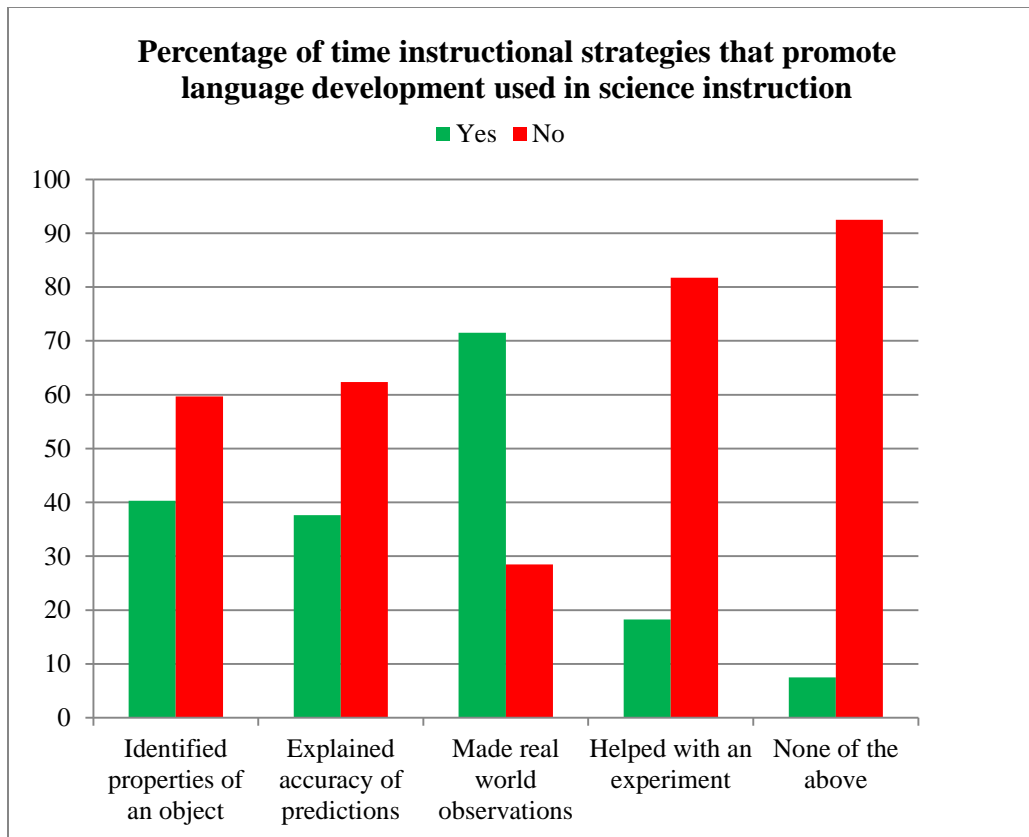


Figure 8: Percentage of time that instructional strategies that promote language development used during science instruction

What was the relative frequency, then, with which teachers reported using these embedded strategies compared with their reported use of strategies during vocabulary, oral comprehension, print awareness, and letters and sounds instruction? Looking across the curriculum in this way, it seems that teachers were engaged in about as much language and literacy promoting strategy use during science instruction as they were during language and literacy skills instruction. A quick calculation of the *aggregate* tendency of teachers to use of strategies that promote language and literacy development during science instruction reveals a figure of 41.93%. This suggests that teachers' use of such practices may have been roughly comparable to teacher strategy use during vocabulary (49.55%), oral comprehension (46.44%),

and print awareness (44.40%) instruction (see Figure 7). In fact, teacher use of language and literacy promoting strategies during science was far more commonly reported than was the use of key strategies during letters and sounds instruction (29.53%). This potentially relatively equal emphasis on embedded instruction during science is confirmed by the fact that the second most commonly employed individual strategy across all skills was making real world observations during science instruction, second only to learning new words in books during vocabulary instruction. Indeed, the fact that teachers very frequently report using these two strategies makes intuitive sense; reading books and talking about the world are common ways of interacting with preschoolers, and are typically featured in curricula and planned instruction. In addition they present many “teachable moments” in which to engage in language and literacy instruction (e.g., Conezio & French, 2002; Wright, 2011).

In sum, my analysis in response to research question 4 suggests that participant GSRP teachers may well have regularly used embedded language and literacy instructional strategies with their students during science instruction. Although teacher strategy use during science instruction was not very abundant, teachers were about as likely to report using such strategies as they were to use research-based strategies during vocabulary, oral comprehension, and print awareness instruction, and were more likely to recall using embedded strategies related to language and literacy development during science than they were to report using strategies to promote children’s knowledge of letters and the sounds they make. In particular, teachers seemed to place great emphasis on making real-world observations with their at-risk students.

### **Summary of Findings**

The purpose of this study was to paint an initial portrait of the enacted language and literacy instruction offered to at-risk children in GSRP classrooms. Although a small number of previous studies have provided estimates of the time allocated to instruction across domains in



preschool classrooms, we have known little about the details of the enacted language and literacy instruction provided in classrooms that target children at-risk of struggling in school. In order to address this gap in the research, and based on evidence demonstrating the effective use of logs during examinations of the enacted curriculum, this study used electronic teacher logs to describe the instantiated language and literacy instruction offered to individual at-risk GSRP preschoolers.

My analyses suggest that little time was spent on language and literacy instruction with the average child in sampled classrooms, and that the reported dose of language and literacy instruction provided to participant children did not vary significantly based on children's gender. Several teachers recalled providing a dose of enacted language and literacy instruction that was statistically significantly lower or higher than that provided by her colleagues. Coupled with results suggesting that teachers varied in the range of minutes of instruction provided to their students, this descriptive finding points to the need for further research to better understand teachers' differentiation of targeted, needs-based language and literacy instruction. However, the average instructional rate of 4.4 minutes per hour suggested by my current analyses stands in contrast to previous results, suggesting that children in GSRP classrooms may experience less language and literacy instruction than is typically offered in classrooms targeting at-risk children. Of the four key language and literacy skills considered in this dissertation study, vocabulary was arguably most likely to be featured during enacted language and literacy instruction, although the results of a correlation matrix do not provide further support for this hypothesis. Regardless, it must be emphasized that teacher reports indicate that all four key language and literacy skills were often missing from the enacted language and literacy instruction experienced by individual children. This was a potentially a particular issue when it came to oral language comprehension, which, based on teacher recollection, was rarely a focus of instruction with children in sampled

classrooms. Considerations of what these rates of instruction and levels of focus on key literacy skills look like over the course of a week, month, and year drive home the possible magnitude of the lost opportunity for GSRP children, a situation made all the worse when one considers the particular need that at-risk children have for increased instruction in language and literacy.

This overall pattern of lost opportunity was arguably confirmed by my examination of the instructional strategies used during enacted language and literacy instruction in sampled GSRP classrooms. Across the language and literacy curriculum, research-based teacher practices appeared to be often missing from the enacted instruction experienced by focal children, and were rarely reported to be a focus of instruction. My results do further confirm the possible tendency of sampled teachers to privilege vocabulary instruction over other language and literacy skills; teacher responses indicated that instruction in this area was comparatively strategy rich, and was especially likely to include the instruction of new words through book reading. In contrast, the letters and sounds instruction offered to focal GSRP children was arguably notably strategy-sparse. In particular, teachers very rarely recalled talking about blending, breaking, and rhyming with children, despite the importance of these practices for the development of phonological awareness.

Finally, my examination of embedded language and literacy instructional strategies during science instruction suggests that teachers' instruction in this area was about as strategy-rich as was instruction on vocabulary, oral comprehension, and print awareness. In fact, teachers appeared to be more likely to use these embedded strategies than they were to use strategies during letters and sounds instruction. However, it must be stressed that, here as well, my results indicate that the average child in GSRP classrooms was only moderately likely to experience these instructional strategies on a given day.

In sum, my findings paint a troubling portrait of lost opportunity when it comes to the language and literacy instruction enacted in GSRP classrooms, despite the fact that these classrooms were designed to provide an academic leg-up for at-risk children. It is imperative, then, to discuss why this may be the case and what actions might best support teachers in improving this potentially problematic situation for at-risk GSRP preschoolers.

## Chapter 5

### Discussion

The purpose of this dissertation study was to provide an initial detailed understanding of the enacted instruction currently provided to at-risk children in areas that especially foster their language and early literacy development. This study addresses gaps in the research on enacted early language and literacy instruction in a number of ways. It focuses on preschoolers in a program targeted to at-risk children, a unique demographic with particular needs for high quality language and literacy instruction. It combines this focus with a broad examination of literacy instruction as it is enacted throughout the classroom and over the course of the day. This stands in contrast to many studies that examine literacy instruction during designated portions of the day, such as circle time, or key locations, such as the book area or writing center. Unlike many extant studies on enacted preschool literacy instruction, my study also includes detailed examinations of the language and literacy topics that were focused on and instructional strategies used by teachers during this instruction. Finally, this study examines strategies used during science instruction that are known to promote language development. The inclusion of such strategies in an examination of the enacted preschool language and literacy instruction is, to my knowledge, unique. Moreover, the inclusion of these embedded instructional strategies more closely aligns the design of my study with how we know language and literacy learning occurs in preschools – centrally and embedded across the classroom. My ultimate goal is that, by detailing the instantiated instruction currently received by at-risk preschoolers, the results of this study

will inform discussions of practice, teacher training, and policy that improve the long-term learning outcomes for children at-risk of struggling in school.

### **Understanding and Improving the Enacted Language and Literacy Instruction Provided in GSRP Preschools**

Together, my results paint a detailed yet troubling portrait of missed opportunity when it comes to the enacted language and literacy instruction currently provided to at-risk preschoolers in GSRP classrooms. Participant teachers appeared to spend only a few minutes per hour on language and literacy instruction with their average student, although there appears to be statistically significant variation from teacher to teacher that necessitates future exploration. Although it is possible that vocabulary is relatively privileged in sampled classrooms, none of the four key language and literacy topics appeared very likely to be a focus of instruction with the average child on a given day. Additionally, my analyses suggest that teachers rarely featured most research-based and GSRP-endorsed instructional strategies, meaning that the instruction they provided to their students tended to be strategy-sparse. This was particularly the case when it came to the instruction provided to teach sampled at-risk children about letters and the sounds that they make. This potential trend is troubling, given that phonological awareness and alphabetic knowledge have both been shown to be particularly beneficial to children's language and literacy development (National Early Literacy Panel, 2009). In short, my results strongly suggest that the targeted classrooms sampled here, designed to give an academic leg-up to children at risk of struggling in school, fall short when it comes to the language and literacy instruction actually provided to the individual child. This is surprising, given the great emphasis placed on language and literacy instruction in both the GSRP implementation manual (State of Michigan, 2011) and Michigan's Early Childhood Standards of Quality for Prekindergarten

(Michigan State Board of Education, 2005), as well as our abundant knowledge of the importance of early language and literacy skills for future success in reading.

### **Time Spent on Language and Literacy Instruction**

Given my findings, what explanations might there be for the current state of language and literacy instruction in GSRP preschools, and what are the related implications for educational change? First and foremost, my findings indicate that little time is spent on language and literacy instruction with the average GSRP preschooler, regardless of the child's gender. However, my finding that the mean number of minutes of enacted language and literacy instruction statistically significantly differs from teacher to teacher suggests that some variation in enacted language and literacy instruction is teacher specific. Because these teacher-specific differences in time spent on language and literacy may result in very different doses of enacted instruction over time (see again Figure 2), it is vital to speculate why such variation may exist. Classroom-specific explanations are certainly possible. For example, it may be that the student body in attendance in certain classrooms requires much more direct guidance and classroom management, thereby limiting the time that teachers are able to devote to individualized instruction in domains like literacy. Another potential explanation for the differential doses of enacted language and literacy instruction revealed in this study is involves the ever-varying and theme-based weekly lesson plans common in preschools. Although best practice calls for embedded language and literacy instruction regardless of theme, topic, or domain, it is certainly conceivable that the lesson plans in use during data collection in certain classrooms lent themselves more naturally to language and literacy instruction than did those enacted in others. For example, one can imagine that a weekly lesson plan celebrating the birthday of Dr. Seuss might, through a focus on shared book

reading, discussion of rhymes, and a joint class book project, result in more language and literacy instruction than would a unit on simple machines.

Teacher-level variables may also go some way to explaining teacher-specific differences in mean enacted language and literacy instruction. For example, it may be that certain teachers are simply less skilled at enacting language and literacy instruction throughout the day, perhaps due to differences in experience, education, or professional development opportunities. Some teachers may well place a higher priority on classrooms organization and cleanliness, leaving less time for language and literacy instruction. In a profession plagued by burnout and teacher turnover, motivation may also partially explain teacher-level differences in total time devoted to language and literacy instruction.

As discussed above, teacher variation in the *range* of minutes of instruction provided to children also raises the possibility that some teachers (e.g. Teacher 5) made conscious and savvy decisions to provide certain students (e.g., students with less well-developed language and literacy skills) with more enacted language and literacy instruction, although the *average* minutes of instruction provided to their students may have not been noteworthy (e.g., 9.92 mins in the case of Teacher 5). Knowledge of the subtle instructional moves involved in needs-based differentiation are vital to a complete understanding of the enacted language and literacy instruction provided by preschool teachers, but fell outside the scope of this dissertation project. They must therefore be the subject of future research through the collection and examination of data necessary for such child-level analyses. Indeed, future research in this area must explore all of the above-mentioned potential explanations as to why some teachers choose to – or are able to – spend so much more time on language and literacy instruction than are others.

Returning to my results that the average child in sampled GSRP classrooms may receive about 4.4 minutes of language and literacy instruction per hour, this figure stands in contrast to extant studies. I have already discussed possible methodological reasons explanations for these differences, and suggested instead that GSRP teachers may simply offer fewer minutes of instruction. Due to the vital importance of early language and literacy skills instruction for children attending targeted preschool programs, speculation as to why this may be the case is imperative. Specifically, considering the wider context is of utmost importance here, as a number of structures within which GSRP teachers operate may alter and constrain their ability to enact language and literacy instruction.

For example, it may be that the curriculum in use in GSRP classrooms facilitates less language and literacy instruction than do curricula used in other programs. Indeed, the Creative Curriculum, although endorsed by the State of Michigan in documents guiding the implementation of the GSRP as “research based” and “research validated” (Michigan State Board of Education, 2005; State of Michigan, 96th Legislature, reg. sess., 2011, 2011) has not been thus supported in recent examinations of curriculum effectiveness. For example, as part of the Preschool Curriculum Evaluation Research (PCER) Consortium, independent researchers evaluated the Creative Curriculum, along with Bright Beginnings. Their analysis of data on the experiences of 209 children enrolled in 21 public preschool classrooms in Tennessee revealed no significant effects on either preschool or kindergarten child outcomes in classrooms using the Creative Curriculum (Preschool Curriculum Evaluation Research Consortium, 2008). In a related study also conducted as part of the PCER project, researchers at the University of North Carolina at Charlotte also engaged in an examination of effectiveness of the Creative Curriculum. Their analysis of data collected in 6 Head Start programs in North Carolina and 10 Head Start



classrooms in Georgia found no significant impacts on the preschool or kindergarten child outcomes (Preschool Curriculum Evaluation Research Consortium, 2008). Together, these results led to the categorization of the Creative Curriculum as exhibiting “insufficient evidence of effectiveness” in research funded by the CfBT Education Trust (Chambers, Cheung, Slavin, Smith, & Laurenzano, 2010). Later research conducted by Teaching Strategies contradicted the work of the PCER Consortium, indicating the success of their own Creative Curriculum (Teaching Strategies, 2013a, 2013b). This prompted a subsequent independent federal review by the What Works Clearinghouse, which works under the auspices of the Institute of Education Sciences. This review identified only two studies that met its standards for evidence (the self-same studies noted above), and concluded that the Creative Curriculum shows no discernible effects on oral language, print language, phonological processing or math for preschool children (U.S. Department of Education, Institute of Education Sciences, & What Works Clearinghouse, 2013, March). In short, despite the no-doubt good intentions behind the endorsement of the Creative Curriculum for GSRP preschools, the reality is that the state of Michigan has specifically recommended teacher fidelity to a guiding framework that has been deemed ineffective at promoting language and literacy learning in key rigorous independent research. This unfortunate disconnect may partially explain differences in amounts of enacted language and literacy instruction found in this and extant studies.

Other potential structural explanations must also be considered. For example, it is possible that the teacher education and training experienced by teachers in the metro-Detroit area has either insufficiently stressed the importance of embedded language and literacy instruction or emphasized other topics, resulting in fewer minutes of enacted language and literacy instruction for GSRP students. This possibility is especially likely given that the year in which the data for

this dissertation study were collected no professional development or coaching was offered to GSRP teachers; due to the elimination of an administrator position during budget cuts such support was cancelled that year. Moreover, it is possible that the relevant GSRP documents are not included in professional development typically offered to GSRP teachers, even when teachers do experience it. Thus, it is unclear whether participant teachers had ever been provided with the implementation manual, which clearly stresses the importance of language and literacy instruction and learning for GSRP preschoolers.

Additional alternative explanations also exist. For example, it may be that unique features of the children living in the metro-Detroit area result in teachers spending comparatively more time on other activities (e.g., entry into the culture of schooling), leaving less time for language and literacy instruction. These and other options must be explored in future studies. For now, it is important to emphasize that the instructional time available over the course of a half day preschool program is very limited. This, coupled with the fact that time that must be devoted to transitions, toileting, and meal-time, means that it is highly likely that teachers feel they are simply not able to carve out sufficient time for language and literacy instruction with their students. It is also likely that teachers are unaware of how just how few minutes of enacted language and literacy instruction their average student experiences on a typical day.

Regardless of the explanations for the current situation, there is arguably a great need to increase the time devoted to language and literacy instruction in GSRP classrooms. This might be accomplished in several ways. Speaking most broadly, my results strongly suggest the need for structural changes to the GSRP program that would support teachers in offering more language and literacy skills instruction to their students. For example, lower teacher to child ratios would increase the odds that individual children would experience instantiated language

and literacy instruction. Additionally, volunteer literacy advocates are needed in GSRP classrooms. Such advocates might be recruited at senior centers, and, after receiving minimal training, be incredibly helpful in increasing individual children's exposure to word games, novel vocabulary words, and books. Increasing the time that GSRP children are in school by offering full day and full year programs would also create additional opportunities for teacher to enact the sort of instruction that promotes language and literacy learning.

On a smaller scale, teacher training and education should be offered to teachers to ensure that they have access to cutting-edge research about the importance of embedded language and literacy instruction and feel supported in enriching necessary and time-consuming routines like transitions, toileting, and mealtimes with language and literacy activities. For example, teachers should be provided with techniques and support to ensure that conversations featuring novel, sophisticated, contextualized vocabulary occur during mealtimes. Similarly, teachers must be directly instructed to use word games that feature rhymes, blending or breaking during transitions. Especially when combined, these broad and small-scale changes will facilitate increased exposure to language and literacy instruction in GSRP classrooms.

### **Teacher Prioritization of and Focus on Key Language and Literacy Skills**

My comparison of the median and mode Likert-scale responses for the extent to which teachers focused on key literacy skills with children suggests that, while vocabulary may be most commonly taught by sampled teachers, there is arguably very little difference in the extent to which print awareness, letters and sounds, and comprehension are taught. Further analyses also suggest that instruction in key literacy skills that predict future reading achievement is often not provided to the average GSRP preschooler on a given day. As reported above, oral comprehension appeared to be least likely to be a focus of instruction with focal children in

sampled classrooms, while vocabulary reportedly received the most focus from teachers. All too often, teacher reports suggest, each literacy skill was not at all instructed on with that day's focal child, with results indicating that this was the case between about 24% (vocabulary) and 38% (letters and sounds) of the time (see Figure 5, above).

When discussing these results, it is interesting to note findings of other scholars, like Wright (2011), who lament the lack of focus on vocabulary in early childhood classrooms. My results echo Wright's findings regarding the scarcity of vocabulary instruction, as well as the overwhelming tendency for teachers to teach vocabulary by pointing out new words in books rather than use a broad range of instructional strategies. However, my examination of the full scope of language and literacy instruction reveals that the situation is even more alarming; although I find, as others have, that vocabulary is not often featured in preschools, I also find evidence that it may actually be the language and literacy skill that is by far the *most* focused on. Moreover, this appears to be the case despite the fact that vocabulary knowledge, while certainly crucial for language and literacy development, is actually less strongly predictive of reading achievement are skills like alphabet knowledge (National Early Literacy Panel, 2009). This point underscores the troublesome nature of the situation in GSRP preschoolers. It also highlights the value of broad examinations of language and literacy that consider a range of related skills and the strategies use to teach them, as the present study has done.

Regarding teachers' potential tendency to favor vocabulary instruction, it may be that teachers believe vocabulary knowledge to be more important than the other pre-literacy skills examined here. This explanation is quite likely, given the large body of research on the importance of early vocabulary knowledge already discussed. However, the exploratory results of my correlation matrix did not provide further for this explanation. Alternatively, it may also

be that teachers more often find “teachable moments” suited to vocabulary instruction than they find instances in which to spontaneously teach other key language and literacy skills. For example, book reading and teacher-child exchanges may more naturally elicit teacher responses about words and their meanings than about rhyming or the blending and breaking of sounds. Indeed, research links read-alouds and other whole-group activities with both vocabulary instruction (Wright, 2011) and vocabulary learning (Hargrave & Sénéchal, 2000; National Early Literacy Panel, 2009), particularly in children with lower receptive vocabulary skills (Coyne, Simmons, Kame'enui, & Stoolmiller, 2004).

In seeking an explanation for the fact that vocabulary, print awareness, letters and sounds and, in particular, oral comprehension, were rarely featured in sampled classrooms, it is perhaps only necessary to refer back to my previous results; considering that teachers spent only 4.4 minutes an hour on language and literacy instruction with their average student, it is unsurprising that focus was but seldom placed on key language and literacy skills. Therefore, supporting teachers in increasing the time spent on language and literacy instruction in GSRP classrooms through structural and classroom-level changes, as proposed above, may naturally increase children’s exposure to key language and literacy skills as well.

However, additional steps may also be required to ensure that all key language and literacy skills are regularly featured in GSRP classrooms, and that all children have access to such instruction. To this end, teachers must be given access to the knowledge and ability to capitalize on and enhance activities in which they are already engaged, such that these encompass a broader range of skills instruction. For example, my results indicate that teachers most often reported engaging in book reading with children, and that this strategy was used to teach vocabulary. By ensuring that instruction in other essential language and literacy topics,

such as phonological awareness, alphabet knowledge, and print awareness, is also embedded into read-alouds, teachers can dramatically and painlessly increase the language and literacy skills instruction that children receive. This sort of instruction can also be encouraged by explicitly describing and requiring it in curricula and key program documents. For example, Michigan's Early Childhood Standards of Quality for Prekindergarten should include more precise requirements about the amount of language and literacy skills instruction practitioners should be engaged in, and how to meet these goals in the classroom. Here, too, oral comprehension instruction should be particularly emphasized. Moreover, teachers need to be given explicit access to these documents.

### **Teacher Focus on Instructional Strategies**

Digging yet deeper into the enacted language and literacy instruction, my findings on the strategies used by teachers during this instruction further confirm that a great deal of opportunity may be lost in GSRP classrooms. Teacher reports suggest that instructional strategies were seldom focused on with focal children in sampled GSRP classrooms. Rather, the majority of instructional strategies were reportedly rarely used, resulting in instruction experienced by the average GSRP child that arguably tended to be "strategy-sparse". This was apparently true for strategies across each of the four literacy skills examined in this dissertation study, and was particularly the case for letters and sounds instruction. Indeed, of the strategies examined in this study the most neglected appear to be breaking and blending sounds and identifying alliterations and rhymes. Teacher responses regarding the use of these strategies are particularly troubling, given the strong connections between both phonological awareness and alphabet knowledge and reading achievement already discussed.

Language and literacy related strategies embedded in science instruction were also arguably rarely a focus of instruction with GSRP children. It is somewhat reassuring, however, that teachers did employ these embedded strategies as frequently as they did similar strategies during vocabulary, oral comprehension, and print awareness instruction. Indeed, teachers employed embedded language and literacy promoting strategies more often during science than they used strategies during letters and sounds instruction. In fact, my analysis indicates that participant teachers were overwhelmingly likely to use at least one strategy known to promote language and literacy development during science instruction with the focal child (only 7.53% reported not using any such strategies). Teachers appeared to particularly stress the importance of making real world observations with the focal child (71.51%), which was the second-most commonly used strategy across all topics.

That teachers appeared able to place only little focus on most strategies is hardly surprising, given my finding regarding the total time spent on language and literacy instruction with the average child in sampled classrooms. The difficulty of providing what could be described as “focused” instruction on any topic in 4.4 minutes of instruction per hour is great. Potential solutions to this troublesome situation therefore echo those detailed above, and include structural changes to increase opportunities for time spent on language and literacy instruction, modifications to important documents related to the implementation of the GSRP program, and increased teacher support through improvements to education and professional development. The arguably predominantly strategy-scarce instruction provided in GSRP classrooms highlights the need to clearly communicate to teachers the expectation that much use of research-based language and literacy instructional strategies can and ought to occur across the curriculum - and to offer teachers the support and guidance needed to achieve this goal. GSRP teachers need to be

able to easily recognize opportunities for such embedded instruction across domains, and be able to identify embedded strategy use as such when it occurs. It is encouraging that some such embedded strategy use currently occurs in the domain of science. By building on this trend and ensuring that teachers have a deep understanding of the impact that embedded strategy use can have, the enacted language and literacy instruction experienced by GSRP students can be dramatically enriched.

In sum, my results suggest that much opportunity is lost when it comes to the enacted language and literacy instruction offered in GSRP classrooms. Further consideration of my findings suggests that this may be due, in part, to lack of availability of instructional time. In addition, it may be that teachers insufficiently understand the importance of – and abundant opportunities for – embedded language and literacy instruction. These issues suggest the importance of program-level structural changes to increase instructional time in GSRP classrooms. They also reveal a need to improve to teacher training and education, ensuring that GSRP teachers understand and can implement embedded, strategy-rich language and literacy instruction across the curriculum. When GSRP teachers are both fully aware of and able to take advantage of ample opportunities to provide strategy-rich and embedded enacted instruction, outcomes for their at-risk students may well greatly improve. Given the highly predictive relationship between early literacy ability and future academic success, such work is crucial.

### **Limitations**

Naturally, there are limitations to this study, each of which points to the need for future research in this area. An overarching limitation that must be kept in mind when interpreting the results of this study is that of generalizability. Because my data focus on a specific group of classrooms housed in three schools, the extent to which they are generalizable to targeted



preschools in other geographic areas is unknown. Thus, while my findings are suggestive, especially when applied to GSRP classrooms, research is needed to confirm the extent to which they can be generalized to targeted preschools in rural, suburban, and urban areas across the country. Moreover, although I consider its focus on at-risk children to be a major strength of this study, the extent to which my results are generalizable to a programs in which children from a range of background are enrolled or a preschools serving more privileged children is unknown.

This study may also be limited by the fact that my data were gathered solely through teacher reports, without the use of direct observation on my part. Although participant teachers were trained on all log items, provided with ample opportunity to ask questions, and asked to fill out a sample log during the in-house training session, it is nevertheless true that the teacher log relied on teachers' perceptions and recollections of their interactions with each focal child. Although both pilot testing of the current log (Carpenter et al., 2007) and related confirmatory analysis (Camburn & Barnes, 2004) strongly suggest the reliability and validity of the log, it is therefore not possible to absolutely confirm the accuracy of the teacher reports upon which my results rely.

Several additional limitations involve the design of the teacher log. For example, some may take issue with the fact that aspects of the log were altered after it was pilot tested for validity and reliability. This is a valid criticism. However, concern related to this issue is mitigated by several facts. First, the changes made to the log did not substantially change the nature or design of the log. Although some questions were added to gather information on additional literacy topics (e.g., alphabet knowledge) the questions asked of teachers directly paralleled those present in the pilot tested version of the log in form (e.g., the use of Likert-type scales). Additionally, the pilot testing and confirmatory analyses conducted by Rowan and

colleagues in their log, on which the final instrument was very closely modeled, further supports the strength of the present instrument as a measure of the enacted language and literacy curriculum (Camburn & Barnes, 2004; Rowan et al., 2004). Nevertheless, future work in this area must involve the re-testing of the log to further confirm its validity and reliability, as detailed below. Given the results of Camburn and Barnes (Camburn & Barnes, 2004), this may be especially important for discrete topics and practices that very rarely occurred.

A second limitation related to the design of the teacher log involves the phrasing of the item that captures teachers' use of strategies that promote language development during science instruction. The log was designed such that teachers were asked to respond with a "yes" or "no" on this item. The resulting binary variable goes only some way to painting a picture of their instruction in this area, leaving the details of the extent to which they used these strategies with the focal student unknown. This design choice prevents me from drawing more detailed conclusions about teachers' language-and-literacy-related instructional moves during their science instruction. Looking across the log, this is also an inconsistency that results in less detailed data about the instructional strategies used during science instruction than was collected about parallel strategies employed during language and literacy skills instruction. This issue needs to be rectified in future versions of the teacher log.

A third potential limitation regarding the log design becomes apparent when the results about teachers' focus on letters and sound instruction and their use of strategies when teaching this topic are compared. According to my analysis addressing research questions 2 and 3, letters and sounds was the literacy skill that was second most likely to be focused on by teachers with that day's focal student. However, it was also the topic in which teacher-reported use of research-based strategies was by far the least likely. This suggests that, although teachers were

engaged in a decent amount of letters and sounds instruction (compared with the other language and literacy skills), they may have relied on instructional strategies other than those included in the teacher log. Future versions of the log should address this issue, perhaps using teacher interviews to reveal the strategies that are commonly used by GSRP teachers.

Finally, as discussed above, it is conceivable that teachers failed to sufficiently understand the log item designed to capture the estimated number of minutes that each focal child spent on language and literacy. This may possibly explain, in part, the disparities between my results and those of colleagues like Paro et al. (2009) and Phillips et al. (2009). It is possible that, despite the training provided to teachers and the directive to the contrary incorporated into the daily log itself, teachers included only time spent on “literacy” as most narrowly defined (e.g., book reading), excluding language and literacy instruction that occurred embedded in domains like science, art, or mathematics. It is perhaps even more likely that teachers failed to recognize language and literacy instruction that occurred during free choice and play time. Future studies relying on teacher report must ensure that teachers understand that language and literacy instruction can (and ought to) occur embedded within content domains and across the preschool classroom, and take this into account when reporting on the instruction received by their students.

### **Contributions to the Literature Base**

Despite these limitations, this dissertation study makes several significant contributions to the research. For example, by employing innovative teacher logs as a data collection method, it takes up the invitation extended by Rowan and colleagues (Rowan et al., 2004; Rowan & Correnti, 2009) to use this methodology as a means to examine the enacted curriculum. In fact, to my knowledge the present study is the first to use such a log at the preschool level. Thus, it

advances our understanding of the use of electronic logs, demonstrating their efficiency and reliability when used in preschool settings.

Indeed, this study's focus on instruction at the preschool level is itself another contribution to the research on enacted language and literacy instruction. Instruction in these areas is vital during the formative preschool years, particularly for at-risk children who are likelier to have a particular need for increased learning in this domain (e.g., Fernald et al., 2013; Hart & Risley, 1995; Hoff, 2003). Moreover, abundant research indicates that differences in language and literacy skills and early reading ability at the onset of schooling predict achievement in reading years later (e.g., Juel, 1988; Stanovich, 1986). Despite these facts, however, most research in this area has examined the enacted curriculum at the elementary level and beyond (e.g., Brock, Moore, & Parks, 2007; Correnti & Rowan, 2007; Rowan et al., 2004; Wright, 2011) at which point children are already able to decode and comprehend written text. In other words, most depictions of the nature of the instantiated language and literacy instruction pass over the most formative and crucial years for development in this area. In contrast, the present study is focused on these critical years.

This study is not alone in its focus on preschool enacted language and literacy instruction. A number of studies do exist that examine this phenomenon. However, these studies leave certain aspects of that instruction insufficiently addressed. For example, there has been an insufficient focus on targeted programs geared toward increasing school readiness in children at greater risk of struggling in school. Of the extant studies identified previously, the most detailed and informative (Connor et al., 2006) includes only a few children from this unique group of learners, despite the fact that they tend to have a particular need for language and literacy instruction during the early childhood years. Conversely, those studies that do focus on the

instruction offered to at-risk preschoolers provide insufficient detail. For example, Paro et al. (2009) include only estimates of time spent on literacy instruction generally, leaving the topics covered and the instructional strategies used by teachers in sampled state-funded preschools unexamined. Similarly, Phillips and colleagues (2009) rely on a composite definition of “literacy”. Howes et al. (2008) present results about the percentage of time that sampled at-risk children spent on letter-sound activities, oral language activities, and being read to, among many other findings. However, their analysis was not focused on the allotment of time and focus across language and literacy topics during the enacted curriculum, and thus leaves much of children’s experiences in this domain unexamined. This study, although it has its own set of limitations, addresses this crucial research gap by combining a focus on children at greater risk of struggling in school with a detailed and comprehensive examination of the language and literacy instruction received by those children. It includes measures to capture not only the total time devoted to language and literacy instruction and the extent to which teachers focused on key literacy skills that predict reading, but also the extent to which teachers used key instructional strategies during their interactions with the focal child.

Importantly, this study is also, to my knowledge, the first examination of the enacted language and literacy instruction provided to at-risk children to consider strategies used during science instruction that particularly foster language development. As such, it builds on previous work indicating that language and literacy learning occurs embedded across domains and that interactions and instructional strategies that foster language and literacy learning are particularly likely to occur during science instruction and exploration (e.g., Conezio & French, 2002; French, 2004; Gelman & Brenneman, 2004; Greenfield et al., 2009; Leung, 2008; Peterson & French, 2008). By including these key science instructional strategies, the present study begins to address

a major gap in the research; most extant studies do not examine language and literacy instruction that occurs outside of “language arts” or “literacy” as traditionally and narrowly defined.

Together, the results of my study paint a troubling initial picture of lost opportunity in GSRP classrooms and suggest that much less language and literacy instruction is provided to the average GSRP preschooler than has likely been assumed. Compared with previous estimates of time spent on language and literacy instruction in targeted preschool programs, sampled children appear to be receiving less instruction in these crucial areas. Little focus appears to be placed on language and literacy skills instruction, and most research-based instructional strategies are seldom used. Interestingly, teachers reported using strategies known to promote language and literacy learning during science instruction about as often as they reported employing strategies related to vocabulary, oral comprehension, and letters and sounds instruction. This suggests that GSRP teachers are engaged in embedded language and literacy instruction in this domain. Yet it must be emphasized that, as was the case with the language and literacy skills, the average GSRP preschooler is arguably unlikely to experience many of these strategies on a given day. Taken together, findings are surprising, as they stand in sharp contrast to the GSRP legislation and implementation manual, both of which heavily emphasize the importance of language and literacy instruction to the GSRP mission of increasing at-risk children’s school readiness (State of Michigan, 2011). My results highlight the imperative need to address this disconnect between both the needs of at-risk GSRP students and the mission of the GSRP and the language and literacy instruction actually enacted in these classrooms.

## **Areas for Future Research**

This study makes an important contribution to the growing body of work on enacted preschool language and literacy instruction. However, there is a great need for additional research in this area. To begin, the log instrument featured in this dissertation study needs to be re-tested to further confirm its validity and reliability. Log validation should begin with the collection of a new sample of preschools serving children from a range of backgrounds. Ideally, this sample will include a substantial number of state- and/or federally-funded programs as well as programs serving more affluent families, ensuring that the log is valid and reliable in a variety of instructional contexts. Participant teachers must then be offered training that includes very clear definitions of all log terms in a reference glossary, practice using the log during the initial training session, and, finally, a “trial run” in which they fill out the log for a focal child before meeting with a trained researcher for clarification and confirmation.

The next step in such a validation process must involve field testing the teacher log. This process should begin with the collection of ample teacher log data over the course of at least a month. Simultaneously, observational data must be gathered, ideally via high-quality video recording. Using these video recordings, trained observers must complete the teacher log for each focal child in turn. These data can then be used to facilitate calculations needed to assess the tool’s reliability and validity.

For example, inter-rater reliability must be examined by calculating exact and comparable agreement for all items on which both the teacher and researcher reported activity. In addition to percent agreement, teacher-researcher agreement levels must be statistically tested using Gammas to control for the effect of ties (R. Gonzalez & Nelson, 1996), and weighted Kappas (Cohen, 1960; Maxwell, McWilliam, Hemmeter, Ault, & Schuster, 2001). In the case of

nominal items, of course, standard Kappas may be used (Cohen, 1960). Kappa scores must then be categorized -- for example, by grouping scores as “almost perfect” (1.0 to .81), “substantial” (.80 to .61), “moderate” (.60 to .41), “fair” (.40 to .21) and “slight” (.21 and below), as endorsed by Landis and Koch (1977). The number of items for which Gammas are significant and Kappas indicate substantial or almost perfect inter-rater agreement will indicate how reliable the teacher log is in accurately reflecting enacted language and literacy instruction in sampled preschools.

Internal consistency of the teacher log must also be measured using Cronbach’s alpha, including measures of the overall instrument as well each literacy subscale. Alpha statistics resulting from pairwise correlations between items will indicate whether items measuring the same construct produce similar scores, suggesting that they are valid measures of the literacy construct in question. Similarly, item-total correlations of specific literacy subscales (e.g., instructional strategies used to teach vocabulary) will indicate the extent to which consistency exists across items within each subscale. Items for which little such consistency is found may need to be removed from that subscale. In short, these measures of internal consistency will both highlight items that obscure the usefulness and validity of the log and confirm the value of others.

Finally, it is critical that debriefing sessions and/or interviews are be conducted to gain vital information about challenges teachers faced in responding to log items for which low reliability and/or validity were found. Feedback about specific issues (e.g., difficulty recalling a particular activity or instructional strategy or the irrelevance of certain items) can facilitate the improvement of both teacher training and of the log itself. In these ways rigorous validation of the reliability and validity of the teacher log will indicate it’s strength as a measurement tool as



well as any areas in need of improvement allow for the use of this instrument in future studies, providing a valuable service to the field.

Stepping back from the log instrument, several broad questions about the instantiated language and literacy curriculum offered to preschoolers remain unanswered and point to the need for further research. For example, how is enacted instruction in this domain experienced by children from different backgrounds across the country? Given that enacted literacy instruction varies greatly from classroom to classroom (e.g., Connor et al., 2006), that preschool standards vary from program to program and state to state in their content, clarity, comprehensiveness, and rigor (Barnett, Lamy, & Jung, 2005; Neuman & Roskos, 2005; Scott-Little, Kagan, & Frelow, 2006), and that children from different cultural and ethnic backgrounds tend to begin formal schooling with particular needs and strengths in their language and literacy development (e.g., Heath, 1983, 1986; Hoff, 2006; Hoff & Tian, 2005) it is all but certain that the enacted curriculum in targeted programs vary from state to state and region to region. Future studies should therefore examine the enacted language and literacy curriculum in preschools designed to increase school-readiness at at-risk children in a variety of geographic areas. Such studies may well reveal why less language and literacy instruction is enacted in GSRP classrooms than had been suggested to be the case in other targeted programs.

Building on such research, comparisons of the enacted language and literacy curriculum must then be made *across* various programs, taking up the work of scholars like Phillips and colleagues (Phillips et al., 2009). Such assessments should include comparisons of rural, suburban, and urban programs. They should also examine differences in the enacted language and literacy curriculum provided in targeted programs and preschools that serve more affluent children. Indeed, extant research indicates the presence of disparities in both the literacy

environment and aspects of literacy instruction experienced by children from different socioeconomic backgrounds (e.g., Duke, 2000; Neuman & Celano, 2001; Wright, 2011). It is therefore highly likely that the enacted preschool language and literacy curriculum differs by socioeconomic status as well. Knowledge of the extent of geographic and socioeconomic differences in the enacted curriculum offered to children will play a crucial role in efforts to improve the instruction offered to at-risk children, who have particular needs for early language and literacy instruction.

Future research is also needed to better understand a number of critical classroom-level aspects of enacted language and literacy instruction not examined in this dissertation study. For example, the extent to which preschool teachers in targeted programs differentiate their language and literacy instruction based on child ability is, as yet, unknown. My previously-discussed initial findings do suggest that some teachers may well be engaged in such differentiated instruction. Indeed, it is very likely that, with a larger and more varied sample, patterns of such differentiation will become apparent across classrooms and programs. Similarly, work is needed to examine the comparative experiences of preschoolers from various ethnic backgrounds. Currently, despite the established mediating effect that differentiated literacy instruction has on learning in early elementary school (e.g., Reutzel, 2007; Tobin & McInnes, 2008), little research has examined differentiated enacted literacy instruction in preschools. This is notwithstanding the fact that enacted curriculum coverage of language and literacy skills may vary more widely among students than between classrooms when teachers instruct in small groups, as is often the case in preschool classrooms (Barr & Dreeben, 1983; Martin, Veldman, & Anderson, 1980). Connor et al. (2006) do examine the *effect* of enacted instruction on children with differing abilities, but do not report differences in *exposure* across ability levels. Understanding these

patterns and how teachers can be best supported in increasing the extent to which they offer individualized targeted instruction based on child ability and background will be crucial work.

It is also critical that we understand the *quality* of the enacted language and literacy instruction offered to at-risk children in targeted preschools. Indeed, attempts to determine which curricula best support early learning in this area have yielded mixed results (e.g., Cole, Mills, Jenkins, & Dale, 2005; Davidson et al., 2009; Ehri, Nunes, Stahl, & Willows, 2001; Lonigan et al., 2011), lending support to the argument that the subtleties of the ways in which curriculum content is imparted to children, rather than merely the content itself, matters for learning (Justice et al., 2008; Pianta & Stuhlman, 2004; Ryder, Burton, & Silberg, 2006). Therefore, future examinations of the enacted language and literacy curriculum must include measures of quality such as clarity, warmth, and responsiveness. The use of observational strategies alongside teacher logs could address this issue, resulting in a richer and more complete understanding of the enacted language and literacy curriculum offered to at-risk preschoolers.

The next step in this line of research would then be to examine the extent to which differences in both quality and quantity of instruction across literacy topics align with differences in student learning. For example, examinations of the relative contribution of different aspects of language and literacy instruction are needed in order to reveal the optimal combinations for focus on instruction of these key skills. Connor and colleagues (2006) are, as far as I am aware, the only scholars to take up this key and complex issue during an examination of the enacted language and literacy curriculum. Their work links specific language and literacy activities experienced by children with alphabet, letter–word recognition, and vocabulary growth, partially revealing the causal mechanisms of quality preschool instruction. However, their study would be improved by a focus on at risk children, especially since this demographic will likely enter

preschool with particular needs for language and literacy instruction and will then likely experience instruction that is distinct from that experienced by less homogenous and/or wealthier groups of children. In addition, the Connor et al. used a broad measure of quality as a control variable in order to more precisely isolate the effect of various content of the enacted curriculum on students' learning; studies are needed that consider combinations of topics covered and measures of quality of the instruction and interacts that teachers use when they spend time on those topics.

A final classroom factor warrants attention in future research in this area: the motivation and reasoning behind teachers' decisions about the allocation of time and focus across language and literacy topics. In other words, we need to know more about not only *what* teachers are doing when it comes to language and literacy instruction in targeted preschools, but also *why* they are making those decisions. As discussed above, it may be that teachers are unable to find additional time to spend on language and literacy instruction with their students. Alternatively, teachers may feel that children in their classroom are uninterested in, or not yet ready to receive, certain language and literacy skills instruction. Conversely, teachers may actually believe that they are spending a great deal of time on literacy over the course of the day, and simply be unaware of how few minutes of language and literacy instruction the average student actually experiences on a typical day. Researchers should consider including teachers interviews in the design of future studies in order to obtain this information and clarify our understanding of teacher decisions when it comes to enacted language and literacy instruction. The results of such studies would likely inform efforts to improve teacher training and policy (e.g., regarding teacher to child ratios, curriculum content, or length of the school day).

This dissertation study also highlights the need to address two additional fundamental and essential questions. First, what are individual children in programs like Michigan's GSRP doing all day, if they are spending so little time on language and literacy? Further work is needed to answer this question, although extant research suggests that they are likely spending a great deal of time on "non-learning time" such as routines, management, and transition (Paro et al., 2009). More comprehensive research looking at the complete experiences of focal children over time are needed to inform policies aimed at improving the enacted instruction experienced by at-risk children. The second and perhaps most crucial as-of-yet unanswered question is this: "How much is enough language and literacy instruction?" At present we have no clear answer. This lessens the impact of studies like mine one on policy and practice. In other words, my argument that a great deal of opportunity is lost when it comes to language and literacy instruction in the state-funded preschools featured in this study means much less when there is no "ideal" with which to compare it. Although my results nonetheless strongly suggest that there is great room for improvement in the language and literacy instruction we offer to at-risk children in programs that were, after all, designed to prepare them academically, we badly need to determine how much instruction adequately prepares such children for success in kindergarten and beyond. In short, determining "how much is enough" is a major part of unpacking what has aptly been called the "black box" of preschool enacted instruction (Connor et al., 2006).

Finally, an important methodological point must be kept in mind when undertaking any of the research championed above. When following any of these lines of research, researchers must take up the notion championed in the present study that preschool language and literacy instruction often effectively occurs embedded within content domains and across the physical preschool classroom. For too long, researchers have tended to examine only aspects of the

curriculum (e.g., vocabulary instruction or story time) and areas of the classroom (e.g., the writing center) obviously devoted to language and literacy instruction in the traditional sense. As a field, we must broaden our expectations of when language and literacy instruction occurs. We must deeply and thoroughly investigate teachers' use of embedded instruction, not only in science (although this domain is particularly effective at promoting language development) but also in areas like art, music, and mathematics. Only then can we gain a truly accurate picture of the enacted language and literacy instruction provided in targeted preschools.

### **Conclusion**

This study suggests that the average GSRP preschooler may experience substantially less language and literacy instruction than has been previously assumed. My results also suggest a general lack of focus on key early skills, particularly on oral comprehension, in the enacted language and literacy curriculum currently provided to the average GSRP preschooler. This disturbing picture of lost opportunity is further supported by my examinations of teachers' use of research-based strategies when enacting instruction in these areas, which in particular highlights the possible lack of strategy use during alphabet knowledge and phonological awareness ("letters and sounds") instruction. Finally, although teachers seem to be engaged in embedded language and literacy instruction in the area of science about as often as they are engaged in instruction aimed at improving children's vocabulary knowledge, oral comprehension, and print awareness, there appear to be missed opportunities for instruction in this area as well. In short, despite ample evidence of the importance of early instruction in language and literacy for children at-risk of struggling in school and the great emphasis placed on language and literacy instruction in the GSRP implementation manual, there is little evidence that such instruction sufficiently occurs in these classrooms.

A substantially greater effort is needed on several fronts to resolve this issue. The language and literacy experiences provided to children in preschools and the ways in which teachers interact with students in providing this instruction are important levers for improving long-term outcomes for at-risk children. Therefore, further research must more accurately define current and ideal practice in enacted language and literacy instruction, and related improvements to policy, practice, and curriculum design must be undertaken. Without such efforts to unpack the “black box” of enacted instruction and improve the instruction provided to children from impoverished backgrounds, the consequences for attendees of programs like the GSRP may be dire. This is an urgent matter of social justice that cannot be ignored.

## Appendix A

### Sample of Teacher Log

#### 7. Vocabulary

**\*How much did you focus on VOCABULARY with [Q1] today?**

- A lot
- A little
- Touched on briefly
- Not at all

#### 8.

**\*What areas of VOCABULARY did [Q1] work on today?**

|  | A focus of instruction | Touched on briefly    | Not instructed        |
|--|------------------------|-----------------------|-----------------------|
| Learned new words in books                                   | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> |
| Used different forms of the same word (e.g., mouse and mice) | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> |
| Focused on the meaning of unknown words                      | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> |
| Sorted words into categories (e.g., red and blue are colors) | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> |
| Used new words to talk about a topic                         | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> |



## Appendix B

### Daily Email to Teachers

Hi [Teacher Name],

Today's log will be about: [Name of randomly generated student].

If [randomly generated student] is absent, please complete the log with [second randomly generated student] in mind.

The link for today's log is: [https://www.surveymonkey.com/s/TeacherLog\\_March6](https://www.surveymonkey.com/s/TeacherLog_March6)

Thank you in advance,

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