Playing Spades: The Rich Resources of African American Young Men

by

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CURRICULUM VITAE

The author was born in Lancaster, Pennsylvania on November 15, 1960. He attended The Pennsylvania State University from 1979 to 1983 and graduated with a Bachelor of Science degree in biology in 1983. He also attended the University of Utah from 2001 to 2003 and graduated with a Master’s of Science degree in education in 2003. He came to the University of Rochester in the fall of 2004 where he began his doctoral studies in education. He pursued his research in teaching and curriculum under the direction of Professor Nancy Ares.
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ABSTRACT

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Alfred R. Schademan

Research has shown that African American young men as a demographic group occupy the lowest levels of academic performance in both science and mathematics. In spite of this educational problem, little research has been conducted on the knowledge related to these disciplines that these young men learn and develop through everyday cultural practices. Such knowledge is needed in order to: 1) combat the deficit views that many teachers currently hold of African American young men, and 2) inform teachers interested in implementing pedagogies in their classrooms that draw upon the knowledge of African American young men.

To add to our knowledge in this field, this study examines the resources that African American young men learn, use, and develop through a card game called Spades. Specifically, the study identifies and analyzes the models and model-based reasoning that the players use in order to win games. The study focuses upon modeling as it is central to both science and mathematics. To imbed player models and reasoning in context, the study employs a syncretic theoretical framework that examines how Spades has changed over time and how it is currently played in a high school setting. The qualitative study uses ethnographic methods combined with play-by-play analyses to reconstruct games and examine player strategies and reasoning that guide their decisions.
The study found that the players operate from a number of different models while playing the game. Specifically, the players consider multiple variables and factors, as well as their mathematical relationships, to predict future occurrences and then play cards accordingly. Further, the players use a number of resources to win games including changing the game to maintain a competitive edge, counting cards, selectively memorizing cards played, assessing risk, bluffing, reading partners as well as opponents, reneging, estimating probabilities, and predicting outcomes. The player models and resources bear striking resemblance to what scientists and mathematicians do when modeling. Lastly, the study identifies eight features of Spades that make it a rich context for the learning and development of significant forms of reasoning. Most importantly, Spades is an empowering context through which the players both learn and display their resources and abilities in order to deal with complex situations. Consequently, the study provides evidence that many African American young men routinely employ types of reasoning in everyday practices that are robust and relevant to science and mathematics.
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Chapter 1: Introduction

The Black-White achievement gap in mathematics and science is a well-documented and perennial challenge in education (Kober, 2001; Norman, Ault, Bentz, & Meskiman, 2001; Smith, 2004; Tate, 1997). Although reasons for the gap are numerous (see Stinson, 2006, for a review), two key school-related factors proposed are teacher bias against students from non-dominant groups (Borman & Dowling, 2005, as cited by Viadero, 2006), and the Eurocentrism pervasive in the pedagogy and curricula of most mathematics and science classrooms creating cultural discontinuities for students from non-European cultures (Boykin, 1994; Ladson-Billings, 1997; Tate, 1995). While teacher bias has been linked to low academic performance for students from non-dominant groups (Borman & Dowling, 2005; Spencer, 1986), making pedagogy more culturally relevant for African American\(^1\) students has proven effective in engaging these students in rigorous learning (Ladson-Billings, 1994; Tate, 1995).

A recent trend in education is to structure culturally relevant pedagogy around the resources that youth from non-dominant groups learn through cultural practices. Cultural practices are historically formed, practical “actions that are repeated, shared with others in a social group, and invested with normative expectations and with meanings or significances that go beyond the immediate goals of the action” (Miller

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\(^1\) I mostly use the term African American in this paper, but as the achievement gap is commonly referred to throughout the literature in terms of Black and White, I use the term Black in sections that discuss this educational problem.
Cultural practices are ubiquitous in everyday life and range from labor, to cooking, to hairstyling, to sports and games. Importantly, group members, as well as educational researchers, value cultural practices for two reasons. First, cultural practices form contexts in which learning and development take place (See Miller & Goodnow, 1995, for several examples). Importantly, individuals gain, learn, use, and develop resources in cultural practice. According to Sewell (1992, as cited by Elmesky, 2005), there are two kinds of resources: human and nonhuman. Non-human resources are produced or naturally occurring objects such as physical tools and money. “Human resources are physical strength, dexterity, knowledge, and emotional commitments that can be used to enhance or maintain power, including knowledge of the means of gaining, retaining, or controlling, and propagating either human or nonhuman resources” (Sewell, 1992, p. 9). Culturally derived interactional patterns or communication styles can also be viewed as human resources. Second, cultural practices play a number of important roles for groups including survival, communication, economic development, and providing enjoyment in leisure activity.

Given the central role cultural practices play in people’s lives, a number of projects focus on how the practices of students from non-dominant groups support learning in school. Such projects are taking place in literacy (Lee, 2000, 2001, 2003, 2007), in mathematics (Ares, Evans, & Schademan, 2006; Ladson-Billings, 1994, 1995a, 1995b; Martin, 2000; Matthews, 2003; Tate, 1995), and in science (Hudicourt-Barnes, 2003; Roseberry, Warren, & Conant, 1992; Seiler, 2001). A common theme across these studies is that researchers first gain an understanding of the resources
that youth learn through cultural practices. They then explore similarities between students’ cultural practices and those practices central to a particular discipline. Lastly, they design pedagogy that bridges cultural and disciplinary practices. In literacy, for instance, Carol Lee’s Cultural Modeling Project draws upon the use of irony, metaphor, and satire in African American Vernacular English to scaffold students’ learning of literary analysis (2001, 2003, 2007). These literary forms are rich resources learned by many African Americans as they engage in the cultural practice of “the dozens” or “trash-talking.” In science, researchers from the Cheche Konnen Center draw upon skills in argumentation and story telling in Haitian Creole students’ communities in order to support inquiry in science (Hudicourt-Barnes, 2003; Roseberry, Warren, & Conant, 1992). Lastly, Seiler’s (2001) work draws upon the interests, language and practices of African American young men to engage them in science inquiry projects of their own design.

During the 2005-2006 school year, I conducted a preliminary study of African American young men playing a four-player card game called Spades at a local high school (Schademan & Ares, 2006). The game is commonly played in the school cafeterias where I conduct research on youth cultural practices for a larger research project (See Ares, Evans, & Schademan 2006 for a detailed description of the larger study). Spades is a fast-paced, fun, and exciting game filled with strategy, cooperation, and intense competition. Further, the game is simple to learn, but complex to master, as it involves conditional probability, memorization, complex strategies, risk assessment, considering their opponents’ historical performances, and
studying opponents’ actions in order to determine their cards and/or strategies. The complexity of Spades makes it an ideal cultural practice for exploring connections between the resources that the players learn and develop through the cultural practices associated with the game, and common practices of scientists and mathematicians.

A preliminary but significant finding of Schademan and Ares (2006) is that through the game of Spades, players learn and develop complex, informal models and use forms of model-based reasoning to guide their strategies and decision making. A number of researchers in science and mathematics education hold that modeling is a central practice in these disciplines (Lehrer & Schauble, 2000, 2004; Lesh & English, 2005; Windschitl & Thompson, 2006). Modeling is the construction of “representations of how some aspect of the world works” (Windschitl & Thompson, 2006, p. 784) and involves using one system to represent another. Modeling is therefore a mode of inquiry into the natural world. Further, modeling involves what Windschitl and Thompson hold is “the most advanced form of scientific thinking” (2006, p. 789-790): model-based reasoning. Model-based reasoning is the cognition involved in the construction, testing, revising, evaluating, and verifying models. Specifically, it includes hypothesizing (Windschitl & Thompson), as well as the consideration of error and alternative models (Lehrer & Schauble).

Models come in a variety of forms including physical, representational, syntactic, and hypothetical-deductive (Lehrer & Schauble, 2000). My professional experiences with modeling in air and water quality have involved representational models. Such models involve the identification of multiple variables in a system, and
the possible relationships between these variables often described in mathematical terms such as inverse and direct relationships. Lesh and Doerr (2003) define representational models as follows:

[M]odels are conceptual systems (consisting of elements, relations, operations, and rules governing interactions) that are expressed using external notation systems, and that are used to construct, describe, or explain the behaviors of other system(s)—perhaps so that the other system can be manipulated or predicted intelligently (p. 10).

Scientists measure the variables that make up a representational model, and then make mathematical calculations based upon the relationships between variables in order to gain insight into or to predict occurrences in natural phenomena. For instance, to predict levels of dangerous bacteria at public swimming areas in lakes, environmental scientists consider a number of variables including the amount of recent rainfall, the flow of nearby rivers, the presence or absence of certain types of algae, and water clarity (Monroe County Department of Health, 2006). Scientists measure each factor, enter the data into the model, make calculations to predict levels of harmful bacteria in the water, and make decisions as to the suitability for public swimming. In this way, scientists use models to predict future occurrences in natural systems.

Similarly, the Spades players that I have observed consider multiple variables and their relationships during the game of Spades. For example, during the bidding
phase of Spades, players commonly consider the likelihood that a card will take a trick, the number of cards held in any particular suit, the bids of both one’s partner and the other team, player tendencies, player levels of expertise, level of confidence in one’s partner and self, and the ability to cooperate as a team. The players consider these variables in order to guide their strategies and decision making during the play of the game. The consideration of multiple variables at work in a system bears resemblance to the kinds of reasoning involved in representational models. One of the goals of the project is to describe the relationship among the variables that Spades players consider in terms of a model.

Given the significant parallels between the modeling and model-based reasoning involved in Spades play and in science and mathematics, a deeper examination of the kinds of models that these young men construct through the game of Spades is warranted. Research related to the models constructed through cultural practice by African American young men includes Nasir’s (2000) study of the mathematics used by African American young men who play basketball. Nasir (2005) also studied the developing and shifting strategies of African American dominoes players. From a sociological perspective, Young (2004) examined the complex worldviews that African American adult men construct through their everyday experiences. Working in middle school science classes, Lesh and Doerr (2003) found that seventh grade African American students produced complex models through engaging in model eliciting activities. These research studies provide

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2 See Chapter Two for a more in-depth discussion of these terms.
important insights into the thinking of African American young men, and their findings will be examined in detail in Chapter Two of this dissertation. However, while these studies examine some important characteristics of mathematical and model-related activities of African American young men, no research has been done examining the models or model-based reasoning that African American young men learn and use in cultural practices. Without knowledge of either the models or model-based reasoning that African American young men bring to classrooms, researchers and practitioners interested in drawing upon their resources relevant to modeling, a practice central to mathematics and science, are operating in a vacuum.

The Research Question

Given this considerable gap in our knowledge, as well as the marginalized position that African American young men currently hold in mathematics and science education, the focus of the study is to gain an understanding of the models and model-based reasoning that African American young men learn and develop through a particular cultural practice. The overarching question guiding this research study is as follows: What kinds of models or model-based reasoning are learned and developed by African American young men playing the culturally valued game of Spades? Given the complexity highlighted above, Spades is an ideal game for examining the modeling or model-based reasoning that African American young men employ in a valued cultural practice.
Rationale for the Study

The research question is important for a number of reasons. First, the card game of Spades affords an opportunity to examine the model-based reasoning of African American young men in a cultural practice that is highly valued in the African American community. Few studies have focused upon the mathematics used by African American young men (Nasir 2000, 2002). No studies have focused upon the model-based reasoning that African American young men employ in a cultural practice. Second, the highly popular and culturally valued game of Spades affords an opportunity to study a context in which African American young men learn and develop forms of cognition related to model-based reasoning. Understanding the context illuminates the full dimensions of the players' thinking which are central to the disciplines of science and mathematics. Such dimensions include, but are not limited to, reasons and purposes for playing the game, the forms of reasoning employed during play, the history of player interactions and actions, and how the players have changed or are changing the game to meet their reasons and purposes for play. Further, a focus on context adds to the literature on model-based reasoning. Such research has come out of the cognitive sciences and has yet to examine the model-based reasoning employed by youth from non-dominant groups in cultural practices taking place outside of school settings. Third, previous studies of cognition in everyday practices have looked at arithmetic, geometry, and measurement (see Masingila, 1994, for a review). By focusing upon model-based reasoning in the game of Spades--which includes probabilistic reasoning, risk assessment, decision-making,
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and strategic thinking--the study adds considerable depth to the literature on cognition in everyday practices. Fourth, research has shown that culturally relevant pedagogy can have significant positive effects upon student performance, helping to mitigate the achievement gap that currently exists in mathematics and science (Ladson-Billings, 1994; Martin, 2004; Tate, 1995). As argued previously, a close analysis of the game of Spades has implications for making mathematics and science education more relevant for African American young men. An understanding of the model-based reasoning of African American young men may help educators construct pedagogy that scaffolds the modeling of these young men into similar practices in mathematics and science classrooms. Lastly, research shows that teachers tend to hold negative and deficit views of African American young men (Ferguson, 2003; Neal, McCray, Webb-Johnson, Bridgest, 2003; Swanson, Cunningham, & Spencer, 2003). A study that highlights the complex ways of thinking that these young men bring to classrooms may reduce the negative views that many teachers hold. In so doing, I hope with this project to contribute significantly to the growing number of studies (Martin, 2003; Young 2004) that highlight the cultural resources that African American young men bring to educational settings.
Chapter 2: The Achievement Gap and Resource-Rich Views of African American Students

Overview of the Chapter

The Spades project seeks to contribute to our knowledge of the resources related to science and mathematics that African American young men learn and develop through a cultural practice. The central argument of this chapter is that resource-rich views can help improve educational contexts for African American young men and contribute to their success in science and mathematics. In this chapter, I present literature that suggests two significant factors contribute to the achievement gap: teacher biased views of students from non-dominant cultures, especially bias towards African American young men, and a lack of culturally responsive or affirming pedagogy in classrooms. I present additional research that a resource-rich view of students can help to mitigate these two factors.

To address these factors contributing to the achievement gap, as well as to provide literature in support of a resource-rich view of students, the chapter is separated into six sections. First, I provide data on the current state of the achievement gap in science and mathematics, focusing upon the marginalized position of African American young men. Second, I review recent literature that challenges deficit notions of African American families and communities, and instead places considerable responsibility for the achievement gap upon schools, mainly in the form of teacher bias. Third, I review the literature on teacher bias and deficit views of students from non-dominant cultures. Fourth, I examine research that
exposes the “culture of power” (Delpit, 1988) pervasive in classrooms creating culturally incompatible contexts for minority students, as well as the responses of scholars of color to this culture who have theorized and operationalized culturally affirming pedagogies. Fifth, as an outgrowth of culturally affirming pedagogies, I review the literature on resource-rich views of African American young men in relation to science and mathematics in order to expose their resources as well as the contexts in which those resources are privileged. Sixth, I review the literature on modeling and model-based reasoning, as this research exposes parallels between practices central to science and mathematics and the related or models and model-based reasoning Spades players learn and develop in a cultural practice. At the end of each section, I return to the Spades study to show how it may contribute in significant ways to our current understandings of, and help to change, the marginalized position that African American young men currently hold in science and mathematics education.

The Current Achievement Gap in Science and Mathematics

The most comprehensive source of data on the achievement gap between White and Black students is the National Assessment of Educational Progress’s (NAEP) trend data. In The Nation’s Report Card: Science 2005 Assessment of Student Performance in Grades 4, 8, and 12 (NAEP, 2006a), the NAEP analyzed the results of national achievement tests for science in 2005. Between 2000 and 2005,
the gap narrowed significantly for fourth graders\textsuperscript{3}, the gap was not significantly changed for eighth graders\textsuperscript{4}, and increased significantly for twelfth graders\textsuperscript{5} (NAEP, 2006a). In math (NAEP, 2006b), the gap decreased significantly between 2000 and 2005 for both fourth graders\textsuperscript{6} and eighth graders\textsuperscript{7}. Using a new assessment with twelfth graders in mathematics in 2005, the NCES found that average scale scores for white and black students differed by 30 points, showing that a considerable gap still exists (NAEP, 2007).

While the NAEP data provide a view of the year to year changes in the gap across differing demographic groups, the National Center for Educational Statistics report (NCES, 2001) followed a cohort of Black and White students’ achievement test results in mathematics from second through twelfth grade. They found that the achievement gap for the cohort narrowed significantly through elementary school, then widened significantly in middle school, and was not significantly changed through high school. Importantly, they found significant differences between the sizes of the gaps when separating groups by gender, with Black males lagging behind Black females.

Overall then, by the end of high school, the gap between White and Black students in science is increasing, and a large gap currently exists in mathematics. The

\textsuperscript{3} Scale scores not reported for fourth graders in science (NAEP, 2006a).
\textsuperscript{4} The gap in scale scores changed from 39 in 2000 to 37 in 2005 for eighth graders in science (NAEP, 2006a).
\textsuperscript{5} The gap in scale scores changed from 30 in 2000 to 36 in 2005 for twelfth graders in science (NAEP, 2006a).
\textsuperscript{6} The gap in scale scores changed from 31 in 2000 to 26 in 2005 for fourth graders in mathematics (NAEP, 2006b).
\textsuperscript{7} The gap in scale scores changed from 40 in 2000 to 34 in 2005 for eighth graders in mathematics (NAEP, 2006b).
data suggest that gains are made in closing the gap during elementary school, but these gains are mitigated by increases in the gap in middle and/or in high school. Of central importance to this research study is that Black young men are falling behind other demographic groups in making gains in mathematics. Essentially then, Black young men are in last place in mathematics, which may also be the case in science, although the data in science are not disaggregated by gender. The finding that Black young men as a demographic group are falling behind other groups in mathematics, and behind most others in science, provides a sound rationale for further research specifically upon Black young men in relation to science and mathematics. Importantly, these data reflect historical trends in mathematics (Tate, 1997) as well as in science.

Contributing Factors to the Achievement Gap

Our understandings of the factors contributing to the achievement gap have changed over time. It is now generally accepted that the gap is the result of a complex interaction among community, school, and home factors (Kober, 2001). Further, the gap is the result of “debts” that have accumulated over the long history of White domination over Blacks in the United States (Ladson-Billings, 2006). However, such nuanced and complex views that consider multiple factors, race relations, and historical context have not always dominated our thinking about the contributing factors to the gap. For instance, the highly influential Coleman Report of 1966, a national comparison of the achievement of Black and White schools and student achievement, found little difference between schools that served Black
students on one hand, and White students on the other (Lagemann, 2000).

Consequently, Coleman reported that differences in resources between Black and White families were the main contributing factor to the achievement gap (Lagemann, 2000). In other words, Black families and homes were to blame for the problem. Although civil rights groups seriously critiqued this view at the time, the Coleman report’s deficit view of Black families significantly influenced thinking about the main contributing factor of the achievement gap (Lagemann, 2000), essentially absolving schools of responsibility for the problem.

However, recent studies using advanced statistical analyses of the data contained in the Coleman Report show a larger influence of school factors than originally found (Borman & Dowling, 2005). Borman and Dowling found that up to 40 percent of the differences in achievement between Blacks and Whites cited in the original report could be attributed to school factors. The recognition that school factors contribute to the gap provides a sound rationale for examining the ways that schools approach education of Black students. This finding shows that school reform efforts can have an effect on closing the gap, an interpretation obscured by the Coleman Report.

Importantly, one significant school factor analyzed by Borman and Dowling (2005) was teacher bias as measured by teacher surveys. The researchers found that student test scores were lower on average in schools that employed a large percentage of teachers that had a bias towards working with White, middle class students. Further, Borman and Dowling compared student test scores within schools and found
significant differences between student scores of teachers who showed racial and class biases towards white, middle class students, and those who did not. These findings suggest that many white teachers tend to hold deficit views of Black students, and that these views negatively impact Black student achievement. The findings of Borman and Dowling are corroborated by current research on teacher bias, which I summarize next.

*Teacher Bias as a Factor Contributing to the Achievement Gap*

The research on teacher bias against African American students focuses upon teacher stereotyping, expectations and perceptions of students. Negative stereotyping can occur before teachers even get to know students. For students with African American movement styles (i.e., walking), teachers in one study perceived these students as having lower achievement levels, more aggressive behaviors, and more likely to need special education than students without these styles of movement (Neal, McCray, Webb-Johnson, & Bridgest, 2003). Such negative stereotyping of African American young men has been shown to affect their academic performance, resulting in declines in achievement as early as second grade, which often become well-established by fourth grade (Spencer, 1986, as cited by Swanson et al., 2003).

Related to negative stereotyping are teacher expectations of students. Fergusson’s (2003) review of the literature on teacher expectations found overwhelming evidence supporting that White teachers tend to hold lower expectations for academic performance for African American students than for White students. During focus group interviews with African American middle and high
school high achievers in mathematics, Gross (1993, as cited by Fergusson, 2003) found that the students were frustrated with the racism that they experienced from teachers in the form of low expectations. These students complained of having to prove themselves year after year with teachers who could not accept them as high performers in mathematics. In such contexts characterized by low expectations, African American students often do not feel supported or cared about by their teachers (Noguera, 2003). Speaking to the power of the self-fulfilling prophecy and connecting teacher expectations to achievement, teacher expectations of both African American and White students correlates highly with student performance on assessments (Ferguson, 2003; Weinstein, Madison, & Kuklinski, 1995).

Teacher perceptions of students can play a role in how African American young men respond to school. Swanson, Cunningham, and Spencer (2003) found a significant negative correlation between bravado behavior by adolescent African American males and perceived positive teacher perceptions. This finding suggests that African American young men may tend to behave better in school, and have more positive attitudes towards school and teachers, when they believe teachers hold positive views of them. Similarly, Swanson et al. (2003) found a significant positive correlation between bravado behavior and perceived negative teacher perceptions. In other words, “when African American males do not perceive the school environment as supportive to their individual goals and development, they may elect to disregard school as a place to receive positive reinforcement for academic success” (Swanson et al., 2003, p. 625). Making matters worse, given negative teacher perceptions, teacher
perceptions affect African American students more strongly than White students. Fergusson (2003) cites a number of studies that show that African American students are more concerned about pleasing their teachers than pleasing their parents. One possible explanation given by Fergusson (2003) for the pronounced effect of teacher perceptions on African American students is the “stereotype threat” (p. 474): the fear that any behaviors interpreted by the teacher as matching negative stereotypes will be met with negative judgments. Operating under such threat creates fear, anxiety and stress for African American students, which can in turn affect academic performance (Steele & Aronson, 1998).

Negative stereotyping, low expectations, and negative perceptions of African American students by teachers and school officials are paramount to operating from a deficit model. Teachers operate from a deficit model when they see students as responsible for their academic failure, without considering other factors like classroom instructional practices. However, we cannot simply blame teachers and school officials for holding these attitudes about African American youth. The Coleman Report, which influenced the thinking in education about African Americans, helped to ingrain in the minds of many the deficit model of African American students and their families. Further, psychological research has also influenced thinking about the intelligence of African Americans. For instance, out of 1,020 researchers of intelligence surveyed, only 15% disagreed that differences in intelligence were in part determined by genetics (Miller, 1995). Unfortunately then, the idea that African Americans have inferior intelligence due to their race is a
persistent myth in our society, a myth perpetuated by scholars in the field of psychology. Further, Brickhouse (1994) reviews several studies from the 1970s and 1980s (most of which have been challenged) that held that both “girls and minorities lack the cognitive abilities” (p. 410) to succeed in demanding subjects such as science. Lastly, Swanson et al. (2003) hold that most research on adolescent African American young men is “undergirded with notions of pathology” (p. 619). Given the long history of research that has supported such deficit models, it is not surprising that many teachers and school officials appropriate negative views of African American students.

Two implications follow from research on the achievement gap and teacher bias against African American students. First, teacher bias in the form of negative stereotyping, low expectations, and negative perceptions has significant negative effects on African American student academic performance, achievement, and success in school. It seems to follow then that addressing these teacher biases may have positive effects upon closing the achievement gap. Second, as many research projects have supported deficit views of African American students, more research is needed that works to undermine teacher bias against African American students and the deficit models teachers employ in practice.

Boykin (1994) holds that recognizing and eliminating cultural deficit views is the first step to creating cultural compatibility in classrooms and improving achievement for African American students. The Spades project is designed to add to the growing literature in science and mathematics education that confronts teacher
bias and deficit models of African American students, especially young men. The Spades project has the potential to reveal the scientific and mathematical forms of reasoning that many African American young men learn though Spades and bring to their classrooms. Findings from the study therefore act as an existence proof that African American young men bring to classrooms valuable resources could support their success in science and mathematics. The Spades project, by helping teachers see the positive resources that many African American young men bring to classrooms, could help to change for the better the negative views that many teachers hold of these students.

I focus next on the body of literature by scholars of color who have created culturally relevant or responsive pedagogy. This body of literature has grown in recent years to challenge deficit teaching models, the negative teacher attitudes towards students of color highlighted above, and to improve education for students from non-dominant cultures by making schools more culturally compatible with student home cultures.

*Culturally Responsive/Relevant Pedagogy and the Achievement Gap: From Cultural Deficit to Resource-Rich Views of Students*

Ladson-Billings (2000) argues that psychological perspectives have historically dominated research on teaching and learning and have essentially ignored the effects of culture in education. The epistemological assumption underlying such research is that knowledge is culturally neutral (Lee, 2003). Such research has led to
a focus on individual learners, often from deficit views, especially in regard to
students from non-dominant groups. However, research in the early 1980s influenced
by anthropological perspectives began to examine culture at work in classrooms.
Coming mostly from sociolinguistic perspectives, researchers found that cultural
incongruencies occur in language and interaction patterns between mostly European
American teachers and students from non-dominant cultures (Au, 1981; Heath, 1983;
Mohatt & Erickson, 1981; Phillips, 1983). For instance, the initiation-response-
evaluation (IRE) pattern of discourse frequently used in teacher-student interactions
and first identified by Mehan (1976) has become hegemonic in classrooms (Larson &
Irvine, 1999). Many students from non-dominant cultures do not engage in the IRE
discourse pattern outside of school contributing to incongruent teacher-student
language interactions in classrooms (Heath, 1983). Such cultural incongruities can
contribute to low achievement for many students from non-dominant cultures.
Ladson-Billings (1995a) recognizes the importance of this line of research for
uncovering the intersections of differing cultures in classrooms, but also critiques its
microsocial analyses for ignoring the larger sociopolitical contexts in which such
cultural incompatibilities occur (Ladson-Billings, 2000). Such research tends to
ignore the larger societal structures that affect how curricula and pedagogy are
enacted in classrooms.

Research from critical perspectives has examined these larger social contexts
and structures missed by the aforementioned microsocial analyses. For instance,
Apple’s (1990) analysis of the “hidden curriculum” worked to expose how a system
of unequal power is both created and maintained through a selective tradition that values the knowledge, meanings, and practices of the middle and upper classes, while devaluing and marginalizing those of the lower classes. Working at the classroom level, Delpit (1988) argues that a “culture of power” (p. 282) operates both implicitly and explicitly through participatory rules or codes enacted by the dominant, European American culture in terms of ways of operating, communicating and interacting. For example, schools tend to privilege competition over cooperation, sitting still over movement, turn-taking over overlapping speech, decontextualized tasks over connecting learning to student experience, and inflexible time schedules (Gay, 1975; Katz, 1985, as cited by Boykin, 1994). Students from upper and middle class families come to school with forms of cultural capital privileged by school practices, placing them at an advantage over students from lower class families (Bourdieu & Passeron, 1977). Making matters worse for students from non-dominant groups, their cultural capital is seen as a deficit, something to be overcome, rather than a resource upon which to build (Boykin, 1994; Villegas & Lucas, 2002). Delpit further argues that those in power rarely recognize the existence of these rules and the power enacted through them, whereas people from non-dominant cultures are acutely aware of their presence. When teachers fail to recognize the culture of power at work in their classrooms, the practices and resources that students from non-dominant cultures bring with them can be marginalized and their academic performance often suffers.

The microsocial and macrosocial research in education cited above has contributed greatly to our understandings of the problems and challenges that students
from non-dominant cultures face in schools. Many notable African American scholars have helped to construct and build upon this research base, informed also by their own experiences in school, society, and as researchers, to combat the culture of power at work in classrooms. Their work has resulted in a number of influential theoretical perspectives on pedagogy and curriculum including culturally responsive teaching (Gay, 2000), culturally relevant pedagogy (Ladson-Billings, 1994), culturally synchronous teaching (Irvine, 1990), culturally salient pedagogy (Hilliard, 1997, as cited by Irvine, 2000), and African-Centered pedagogy (Pollard & Ajirotutu, 2000; Murrell, 2002). These theories operate as guiding frameworks for the pedagogy of teachers of African American students, as well as for students from other marginalized groups. Although these perspectives have notable differences, the goal of this group of theories is the same: to improve educational contexts for minority students by recognizing, valuing, and helping them to maintain their cultural integrity while increasing their academic performance (Geneva Gay, personal communication, March 23, 2006).

These goals are reflected in two of the three primary tenets of Ladson-Billings’ (1994, 2000) *culturally relevant pedagogy* (CRP). Her theory focuses upon helping students gain both academic achievement and cultural competence. Holding high expectations for students and demanding academic excellence, while building and maintaining students’ African and/or African American cultural integrity, are central to CRP. Importantly, helping students maintain cultural competence requires teachers to have an in-depth knowledge of African American life and culture. Setting
her theory apart from the others, and influenced by critical pedagogy, is a third component of CRP: a focus upon building socio-political consciousness by exploring controversial issues of local importance. Building critical consciousness allows students to connect schooling to local, national and global issues and to think critically about the school and society that works to marginalize their cultures and identities.

Ladson-Billings (1994, 1995) based her theory upon empirical evidence gathered in her research on successful teachers of African American students. Further, a number of studies demonstrate the efficacy of the CRP in improving achievement for African American students, especially for African American young men (Foster 1993, 1994; Ladson-Billings, 1997; Tate, 1995). Drawing from a variety of sources (Foster, 1993, 1994; Ladson-Billings, 1994; Haberman, 1992, 1995), Foster and Peele (1999) outline a number of characteristics of successful teachers of African American young men. Such traits involve persistence, the ability to foster caring and productive relationships with students, having high-expectations for all students, making curriculum relevant to students’ lives outside of school, organizing learning around cultural and social events, fostering cooperation and collaboration among students, maintaining discipline in a firm, consistent, and respectful manner, and forging deep connections to the community in which students live. Many of these teacher characteristics or dispositions align with the central tenets of CRP.

A central theme contributing to the success of the culturally relevant/responsive family of theories is a culturally affirming, rather than a cultural
deficit perspective of students from non-dominant groups (Villegas & Lucas, 2002).
Culturally affirming perspectives are paramount to a “resource-rich” (Ares, Evans, &
Schademan, 2007, in review) view of students from non-dominant cultures, examples
of which are common in the literature. For instance, Boykin’s (1994) work highlights
the maintenance of African American student cultural integrity by nurturing their
forms of “Afro-cultural expression” (see p. 249 for a discussion). As cited above,
Ladson-Billings (1995, 2000) expresses a similar view with her focus upon cultural
competence, which “represents a student’s ability to identify positively with African
or African Americanness” (2000, p. 190). Further, one of the six central strands of
culturally responsive teaching is a culturally affirming orientation towards students
(Villegas & Lucas). Research from cultural-historical perspectives proposes similar
views. Research on the funds of knowledge that Latina/Latino students learn through
cultural practices to support local economies emerge from a resource-rich view of
students as well as their communities (Gonzalez, Moll, & Amanti, 2005; Moll &
built upon the idea that student knowledge and ways of interacting gained through
cultural practice are valuable resources upon which teachers can build understandings
of formal literary practices.

Culturally affirming perspectives are especially salient given the findings
presented above on teacher bias and the deficit views of students emanating from the
culture of power at work in classrooms, and the effects of these negative views on
minority student academic achievement. Boykin (1994) suggests that to improve
education for African American students, schools need to acknowledge their cultural integrity and build upon their cultural capital to create cultural compatibility in the classroom. By using student “Afrocultural expression” (Boykin, 1994, p. 249) as a resource for learning, teachers can help students realize their competencies and augment both student motivation to learn as well as their academic performance. Boykin offers empirical evidence to support his argument by citing a number of studies that show that academic performance of African American students increased when combined with music and opportunities for movement (Allen & Boykin, 1991), and when using collaborative, small group activities (Albury, 1991, as cited in Boykin, 1994; Ellison & Boykin, 1992; Jagers, 1988). These studies show that elements of Afrocultural expression can be used as resources to support African American student academic achievement.

As research on deficit views of African American young men cited previously shows, teachers often fail to recognize student cultural competencies. Boykin highlights the devastating effects of such pedagogy. Without teachers recognizing and building upon student resources, Boykin argues that “outlets for intellectual competencies will continue to be denied; [and] existing skills will be overlooked,” resulting in the construction of “impenetrable cultural borders” (p. 251) in classrooms, leading to academic failure.

Although not focusing upon an African American young man, Barton and Yang’s (2000) case study of Miguel provides a disturbing illustration of Boykin’s point. Barton and Yang interviewed Miguel, a young Latino father residing in a
homeless shelter with his family. He was an amateur herpetologist whose knowledge of the subject was gained from extensive experience owning, raising, breeding and researching reptiles and amphibians in his home. He played an important role in his community’s funds of knowledge by acting as the resident expert on these animals and by supplying his friends and neighbors with pets and services. His practices served as rich contexts for learning both the content and processes of science. Unfortunately, not one science teacher recognized or drew upon Miguel’s background in herpetology during his entire high school career. Miguel’s story is one of missed opportunities to combine his rich resources with that of formal schooling in order to place Miguel on a trajectory of entering a profession related to herpetology. Such a trajectory may have prevented him from eventually losing his home and ending up in a homeless shelter. Barton and Yang saw Miguel’s situation as one of countless lost opportunities for capitalizing on the rich knowledge that students from non-dominant groups bring to classrooms. The accumulation of these lost opportunities across the nation’s schools every year contributes not only to the achievement gap in science and mathematics, but also to the reproduction of a class-based society in which non-dominant groups disproportionately occupy lower socioeconomic levels. Recognizing and valuing the cultural resources of students from non-dominant groups thus becomes an issue of social justice.

Projections of the demographic composition of students and teacher populations speak to the urgency of replacing deficit with resource-rich views of African American students. By the year 2035, most school-age students in the
country will be nonwhite while a majority of their teachers will be white (Villegas & Lucas, 2002). Although the population of African American students will show only modest growth, they will comprise 16% of the school age population by 2050 (Villegas & Lucas). Given the projected demographic data, the achievement gap may only worsen, resulting in even more students from non-dominant groups, and subsequently larger percentages of the population, failing at school and having lower socioeconomic status. As cited above, minority student failure is exacerbated by teachers who hold deficit views of students based upon how they walk and dress, or the color of their skin. Operating from such deficit perspectives, a teacher often sees such students as bringing only problems, not rich resources into their classrooms. Under such conditions, what chance do African American students have to maintain their cultural identities and to develop the kinds of supportive relationships with teachers needed for success in school? A resource-rich view of students attacks this very issue. It begins from the perspective that all students, regardless of their race, culture, class, gender, or ability, bring rich, culturally derived resources into classrooms. As the research cited above suggests, by identifying, valuing, and building upon such resources, teachers can help students maintain their cultural integrity while achieving success in school.

The Spades project is designed to add to our knowledge of the rich resources that African American young men learn through cultural practice and bring to classrooms. Boykin (1994) emphasized the importance of building upon African American student resources in schools. In doing so, he poignantly stated the central
theme of the Spades project. Boykin argued that building upon student resources can “(1) provide outlets for, and further develop, already or potentially existing competencies that have been fundamentally linked to such contexts outside of school, [and] (2) discern intellectually valued skills in groups for whom such skills were thought to be absent” (p. 251). Spades as a cultural practice forms a context in which African Americans learn and develop exactly the kinds of proficiencies to which Boykin is referring. Further, the Spades players show existing proficiencies in a host of resources related to science and mathematics (e.g., probabilistic reasoning, modeling). A detailed analysis of both the game, and what the players learn and develop through play, could help practitioners of science and mathematics gain an understanding of not only the rich resources that African American young men are bringing into their classrooms, but also of the contexts that give rise to their development.

To summarize the findings in this section, research on culture in the classroom related to the achievement gap has uncovered a number of important findings connected to African American student achievement in schools. First, the culture of power pervasive in classrooms throughout our nation’s schools creates cultural discontinuities for African American students. The result is usually a marginalization of African American students, as well as students from many non-dominant groups, which contributes to low academic performance. Second, over the past 20 years educational researchers of color have developed insightful, useful, practical, and successful theories to guide teacher pedagogy. A number of studies have shown that
pedagogies responsive to student cultures can have a positive impact on their academic performance in schools. Central to the success of these theories in practice is a resource-rich or culturally affirming view designed to combat deficit notions of minority students. Combating deficit with resource rich views of students becomes especially salient given future demographic projections which predict a mostly student of color population with mostly white teachers. By making the resources of African American young men apparent, the Spades project hopes to contribute to the growing efforts in educational research designed to ensure that the competencies that many African American young men bring into classrooms are not ignored, and that these young men do not become missed opportunities.

*The Scientific and Mathematical Resources of African American Young Men Learned and Developed in Cultural Practice*

In the above section, I approached student resources generally. In this section, I review the scant but rich literature that focuses upon the resources of African American young men in relation to science and mathematics. The dearth of this literature on African American young men in regards to their resources is indicative of the mostly negative views that social science research has historically taken of them. It is also indicative of the novel nature of this field of study. Given the scant research, I analyze in detail the central findings of the individual studies reviewed in an effort to cover what we know about the resources of African American young men in relation to science and mathematics, as well as how the Spades study could add to
this growing literature in fruitful ways.

In mathematics education, Nasir (2000, 2002, 2005) focuses on the intimate links between practice, culture, identity, and learning. Her research has uncovered a number of resources that African American young men learn through two cultural practices: playing basketball and dominoes. For example, Nasir (2000) found that basketball players perform significantly better on mathematics problems involving percentages and averages than non-basketball players when estimated answers were considered correct. Further, she found that the players used specialized problem-solving techniques that non-players did not use. Also, when comparing younger and older players, she found that high school players preformed significantly better than middle school players, as they used statistics to solve problems. These findings suggest that through basketball, players learn specialized strategies for solving mathematical problems, can perform such calculations at higher levels than non-players, and that they can solve more complex problems with more accuracy the longer that they play. Likewise, in her longitudinal analysis of African American dominoes players, Nasir (2005) found that the players used increasingly complex strategies, and used artifacts in new ways, as they played at higher and higher levels of play.

The main focus of Nasir’s (2002) project is to better understand the development of mathematical thinking of African American youth in relation to the shifting goals and identities constructed in the practices of playing dominoes and basketball. Her findings highlight the relationships between goals, identity, and
learning in practice. Through separate but related analyses of basketball and dominoes, Nasir found that goals are formed in alignment with practice-linked identities, and that the accomplishment of these goals creates shifts in identities. As one engages in a practice, both mathematical and practice-linked goals become more sophisticated in relation to higher levels of play. Mathematical goals are embedded in and made in relation to practice-linked goals. Further, the identities of players shifted as they increasingly identified themselves with the practice, and the nature of their participation in the practice changed with time. “At higher levels of play, the game becomes increasingly a forum for sophisticated uses of language, new norms about game play, increased expectations about the presence of sophisticated game goals, and increasing coordination between partners and sophisticated ways to request and offer help in play” (Nasir, 2000, p. 29). Importantly, not only do individuals change in relation to their participation in a practice, the nature of practices change as the practices gain increasing levels of importance to the communities in which they take place and have evolved. It is within these dynamic contexts that African American youth learn and develop the valued cultural and mathematical resources that they bring with them to science and mathematics classrooms.

Focusing upon science education, Elmesky and Tobin (2005) take an even more explicit resource-rich view than Nasir, as they employ African American youth as student researchers in a university-based program. Elmesky and Tobin study the youths’ resources used in the process of creating innovative instructional videos for describing and explaining complex natural phenomena. Like Nasir, they also attend
to the contextual factors that promote the use of culturally valued resources. While observing the student researchers, Elmesky (2005) initially identified elements of Boykin’s (1994) Afrocultural expression including movement, verve, and orality. She also observed resources such as drawing upon social relationships to solve problems, drumming, dance, motion, “rhythm, verbal fluency, and high energy” (p. 335), “colorful and creative discourse” (p. 338), emotional expression, and student shared knowledge of the discursive practices involved in rap music. Importantly, the students became empowered as they used these resources in new ways, along with real world experiences, to contextualize and make sense of abstract physics concepts dealing with sound such as amplitude, pitch, and frequency. Further, the students used resources valued in their peer communities. In so doing, they gained the respect of their peers, a highly valued source of social capital in African American peer groups (Seiler, Tobin, & Sokolic, 2001). By gaining status and respect within their peer groups, the process of creating the video and learning science by using culturally valued resources proved empowering to these students. Their sense of empowerment extended beyond the end of the project, as the student researchers gained respect from peers and teachers when they returned to school and acted as role models for other students working on similar projects.

Similarly, Seiler (2001) focused upon the resources of African American young men, but did so during a science lunch program she conducted at a high school in a large eastern city. Seiler initially looked at the students’ resources in terms of interests and motivations in relation to science, interests that included the construction
of large structures, building demolition, pets and pet care, collecting organisms native to urban environments, and science-related topics in movies and sports. While engaging the students in activities around their interests, Seiler observed a number of resources including verbal adeptness, recall of facts and statistics, and the ability to listen to others in discussions around making sense of complex natural phenomenon. Importantly, the students showed the ability to argue both passionately and coherently, and support their arguments with evidence in the form of graphs, statistics, and videotape.

As crafting arguments is a central practice in science (Latour & Woolgar, 1979; Lehrer, Schauble, & Petrosino, 2001), Seiler’s study helps us to make further connections between African American young men’s resources and practices central to science and mathematics. Likewise, Hudicourt-Barnes (2003) focuses upon cultural practices and argumentation with Haitian Creole students. In science classrooms, she invokes the cultural practice of *diskisyon*, a style of argumentation and conversation in Haitian Creole communities. By appealing to *diskisyon*, Hudicourt-Barnes exposes the commensurability between everyday student cultural practices, and crafting an argument, a central practice of science (Warren, Ballenger, Ogonowski, Roseberry, & Hudicourt-Barnes, 2001). In doing so, she found that the Haitian Creole students in her classrooms were predisposed to engaging in practices central to scientific inquiry.

I draw two main conclusions from the research on the resources of African American young men learned in cultural practice and related to science and
mathematics. First, such resources are common in African American young men. The kinds of practices in which these young men engage (i.e., basketball, dominoes, and Spades) are common practices for many African American young men. The everyday nature of the practices suggests that the resources gained from them are commonly found in African American young men across the country. In all of the studies cited above, these young men have valuable scientific and mathematical resources that could be put to work in productive ways in classrooms. Second, a number of the resources highlighted show remarkable resemblance to resources central to the practices of science and mathematics. Mathematical skills in general, especially the problem-solving skills using statistics developed by Nasir’s basketball players, are valuable resources in scientific data analysis. Further, argumentation is so central to science that experimentation, the once *sine qua non* process of science, is now seen as a complex form of argumentation (Lehrer, Schauble, & Petrosino, 2001). As Seiler’s (2001) findings demonstrate, African American young men draw upon a host of resources to craft evidence-based arguments. Hudicourt-Barnes’ (2003) study shows that cultural forms of argumentation can be implemented successfully in science classrooms. Such findings should encourage educators to realize, value, and nurture the resources of African American young men, as they are highly compatible with the practices of science and mathematics. The Spades project highlights the commensurability between the resources used by African American young men in Spades, and modeling, a central practice in both science and mathematics.

However, highlighting the resources of African American young men is only
part of the story explored by this new line of research. All of these researchers recognize the intimate connections between culture, learning, identity and power.

Elmesky’s (2005) work is especially helpful in that it connects cultural resources and their use in practice to power relations, the implications of which I cover in detail in Chapter Three which focuses upon the theoretical framework invoked in my study. Elmesky’s (2005) study helps us to gain insight into the reasons some contexts, such as the video project, are empowering for African American students, while others, like traditional science and mathematics classes, are often dis-empowering. In the former, African American student cultural practices and resources are valued, and students use their agency to explore new ways of putting their resources to work in productive ways. Following Boykin’s (1994) cultural compatibility and Ladson-Billings’ (1995) focus upon cultural competence, such contexts preserve student cultural integrity and identities while opening up avenues for students to explore the practices of disciplines such as science and mathematics. Such contexts make apparent the connections between student cultural practices and resources, and the practices of science and mathematics, as students become active and empowered agents in the cultural production of knowledge (Elmesky, 2005). From this perspective, the culture of science and the cultural selves of African American students become compatible, resulting in a sense of empowerment indicated by the following quote from one of Elmesky’s students: “I am science and the world is mine” (p. 335). On the other hand, in classroom contexts dominated by the culture of power, valued African American cultural practices and resources are often
marginalized, leaving students feeling separated not only from the resources and practices so closely linked to their cultural identities, but also from the central practices of science and mathematics. Classrooms dominated by such contexts of marginalization typically result in “impenetrable cultural borders” (Boykin, 1994, p. 251) that are difficult, if not impossible for many students to cross.

Research from a resource-rich view of African American young men in relation to science and mathematics therefore has two primary strengths. The research to date has identified a number of resources of African American young men. It has also gained insight into culturally compatible contexts built on the commensurability between student cultural practices and resources and those central to science and mathematics. The Spades project builds upon this research in two ways. First, by focusing upon the context of the game, the Spades project highlights a number of factors that contribute to the learning of such robust resources. Elmesky’s (2005) work is foundational, but she does not analyze the power relations involved in the use of resources in a cultural practice taking place in naturalistic settings. By examining the use of cultural resources in practice, the Spades project provide insight into the power relations of the players and the Spades community at the high school, as they engage in a valued cultural practice. By better understanding resource use in practice, and the power relations involved in their use, the Spades study provides insights that will help teachers design contexts that consider power relations and support student resources in science and mathematics classrooms.

Second, the project highlights a number of hitherto unidentified resources that
African American young men learn and develop through Spades. Importantly, one such resource is that of model-based reasoning in relation representational models. To my knowledge, no research has been conducted that makes explicit connections between the resources learned and developed in cultural practice by African American young men, and the practice of modeling and the kinds of reasoning it involves. Akin to the insights gained by Hudicourt-Barnes (2003) and Seiler (2001) in relation to argumentation, the Spades project highlights the compatibility between modeling in science and mathematics, and the player resources learned and developed in Spades.

**Modeling and Model-Based Reasoning**

At its most basic level, modeling is the construction of “representations of how some aspect of the world works” (Windschitl & Thompson, 2006, p. 784) and involves using one system to represent another. Lehrer and Schauble (2000) hold that modeling can also be described as involving “the self-conscious separation of a model from its referent, the explicit consideration of measurement error, and the understanding, based on analysis of model-world residuals, that alternative models are possible, and may in fact be preferable” (p. 40). In other words, modeling and model-based reasoning involve the understanding that the model is not the thing that it represents, that models are tentative and open to change, and that modelers test and revise existing models.

In order to further our understanding of modeling and model-based reasoning, Lehrer and Schauble (2000, 2003) propose a typology that includes four kinds of
models. Importantly, their typology represents a developmental trajectory starting with basic kinds of physical models, and ending with abstract hypothetical models. As we move across this trajectory, not only do the models increase in their levels of abstraction, so does the model-based reasoning involved in their construction and understanding.

Physical models are the most basic form of modeling. Most of us can remember models that our science teachers used to help us understand the solar system and the movement of the planets, the structure of a DNA molecule, or the arrangement of the internal organs of a frog. Such physical models help us to make sense of natural phenomenon either too large or too small to observe with human perception, or internal systems not readily seen without intrusive methods like dissection.

However, other kinds of models move past physical representations. As cited in Chapter One, Lesh and Doerr (2003) describe such representational models as:

- conceptual systems (consisting of elements, relations, operations, and rules governing interactions) that are expressed using external notation systems, and that are used to construct, describe, or explain the behaviors of other system(s)—perhaps so that the other system can be manipulated or predicted intelligently. (p. 10)

Representational modeling involves the identification of a number of variables in a system, understanding relationships between these variables, and how changes in one variable, or the introduction of new variables, may affect a system. The purposes of
representational models are primarily prediction and/or control of systems. Computer models of weather systems used by meteorologists are excellent examples of representational models used for prediction. Scientists input measurements of meteorological variables at work in a system (i.e., temperature, pressure, wind speed and direction, etc.) into a model in order to help predict future regional weather conditions.

With representational models, the central process of inscription becomes apparent. Inscription involves the transformation of any entity into a symbolic system (Latour, 1987). Modeling may begin with a physical representation, then progress to representational models consisting of variables and relationships. Both language and mathematical symbols are involved in inscriptions: the former identifying variables, and the latter, describing their relationships (i.e., direct, inverse, etc). As models progress from physical to representational, they become more symbolic and further removed from their material referents. For example, the classic (and most reviled) science fair demonstration is no doubt the baking-soda-and-vinegar-charged model of a volcano. A student with certain skills, mentoring, knowledge, and material supplies can make a model that actually looks like a volcano and simulates an eruption. However, representational models that attempt to predict eruptions, and include both variables and their mathematically defined relationships, are much farther removed from the volcano itself, as they attempt to represent the processes that take place within volcanoes that lead to eruptions.

Syntactic models bear even less resemblance to their referents than
representational models, as they attempt to “summarize the essential functioning of a system with object and relations that are literally not present in the phenomenon of interest” (Lehrer & Schauble, 2003, p. 66). Examples of syntactic models include using coin flips to model the foraging behaviors of animals, or the use of mathematical distributions to describe plant growth (Lehrer & Schauble, 2003). Neither coin flips nor distributions resemble their referents: they are merely analogous systems. The logic in syntactic modeling is that one system is analogous to another, and thus can be used to gain insight into a particular system of interest.

The fourth and last type of model described by Lehrer and Schauble (2000, 2003) is a hypothetical-deductive model. Such models “incorporate mechanisms that can produce unseen and even unpredicted behaviors” (Lehrer & Schauble, 2003, p. 67). Hypothetical-deductive models can describe entities that are unobservable (molecules) which can interact in highly random ways to result in emergent phenomena. For example, although the behaviors of social insects appear to be complex, the building of a termite mound “can be modeled as interactions of agents following relatively simple rules” (Lehrer & Schauble, 2003, p. 68). The central insight of these models is that the simple rules under which they operate produce emergent phenomena that appear more complex than expected (Lehrer & Schauble, 2003).

For the purposes of the Spades study, models are what Spades players “develop (explicitly, not just implicitly) to construct, describe, or explain mathematically significant systems that they encounter” (Lesh & Doerr, 2003, p. 9).
As card playing entails a mathematical system, modeling plays a role in how the players approach and make sense of the game. One of the foci of this study is to reify the player’s models explicitly through ethnographic research methods. Such models include the factors and variables that the players consider when making decisions, the mathematical relationships between variables and factors (i.e., direct and inverse) that the players both use and understand when playing, and other forms of reasoning players use to make decisions. The players do so in order to predict future outcomes and play particular cards accordingly. Consequently, the models of the Spades players are analogous to the representational models described above in which scientists consider the variables in a system, as well as their mathematical relationships, in order to gain insight into natural phenomena and to predict future outcomes.

However, research on modeling suggests that models constructed by people contain more than just cognition and mathematical and scientific content. Student constructed models also contain components of student selves including their social roles, interests and identities (Middleton, Lesh, & Heger, 2003). All of these components can be viewed as being constructed through model-eliciting activities in relation to mathematical and scientific practices and content.

In the Spades study, I extended what might be considered as a part of a model by recognizing that the game of Spades is a cultural practice taking place within contexts with social, political, historical and cultural dimensions. As the modeling practices of the Spades players have developed within these contexts, the resources
learned within them bear their influence. Consequently, I have remained open to culturally derived resources that might be central to an African American Spades player, but not readily apparent to a European American researcher like myself. Certainly, aspects of models such as quantities, relationships, and the rules play a central role in the analysis of the Spades players’ models; however, only by remaining open to the resources of the players, as well as the contexts which they are used and developed, could I have hoped to gain insight into the culturally derived modeling practices of Spades players.

The rationale for a more cultural approach to research on modeling practices has already been laid out by previous studies on modeling with African American students (Lesh, Hoover, Hole, Kelley, & Post, 2000, as cited in Lesh & Doerr, 2003). Lesh et al. (2000) conducted modeling activities with African American students labeled at-risk in a remedial mathematics class in an urban school setting. Lesh and Doerr (2003) reported that the students were “capable of inventing (or significantly modifying, refining, or adapting) powerful mathematical or scientific constructs that are much more sophisticated than anybody had dared teach them” (p. 23). Further, Lesh and Doerr (2003) provide impressive samples of the students’ work. The authors attribute the students’ successes to being engaged in a series of model-eliciting activities. Lesh and Doerr (2003) argue that they were able to help students bring together their “real heads (that function ‘on the streets’ outside of school)” with their “school heads (that are used to respond to questions from textbooks, tests, and teachers)” (p. 24).
I would argue that what Lesh and Doerr (2003) refer to as the students’ “real heads,” are situated forms of cognition learned and developed in cultural practice, and that one could view such forms of cognition as cultural resources. By engaging these students in modeling activities, Lesh and Doerr (2003) were able to draw upon the resources of the students in significant ways. I would further argue that the students were predisposed to excelling in modeling activities, as their cultural resources bore similarities to the kinds of reasoning central to modeling reviewed above. Invoking Sewell’s (1992) view of agency (covered in detail in Chapter Three), the students were able to transpose cultural schemas and resources learned in one context into a classroom. Such findings not only support leveraging student resources in classrooms, but also the use of model-eliciting activities, as they are open to the transposition of student resources learned through cultural practice.

One of the central goals of the Spades project is to better understand the resources that Spades players, learn and develop through cultural practice, so that events described by Lesh and Doerr (2003) may no longer come as a surprise to anyone. As presented earlier in the research on the resources of African American young men, and again in the work of Lesh and Doerr (2003), African American students come to our classes with culturally formed resources that predispose them for success in science and mathematics. The use of model-eliciting activities could play a role in helping to create such contexts, but not without an appreciation for the cultural resources that African American students bring to classrooms and the power relations involved in the varied contexts in which they put those resources to work.
With the Spades study, I seek to aid in this significant effort by making explicit the connections between modeling in science and mathematics, and the models that Spades players construct in cultural practice.
Chapter 3: Methodology

Overview of the Chapter

The purpose of the chapter is to describe in detail the research methodology of the Spades study. To do so, the chapter is divided into three sections: theoretical framework, research methods, and issues in qualitative research. In the first section, I describe the theoretical framework: a combination of two theories from which I used to gain insight into the cultural practice of Spades and the resources of the players. In the second section, I describe the research methods by focusing upon the following components of the study: research question, setting, participants, methods, data sources, data collection procedures, and data analysis. In the third section, I discuss how the Spades study meets five criteria for ensuring the trustworthiness (Guba, 1981) of its findings.

Theoretical Framework

"If the doors of perception were cleansed every thing would appear to man as it is, infinite. For man has closed himself up, till he sees all things through narrow chinks of his cavern."

William Blake, The Marriage of Heaven and Hell, c1790

The human condition is in part characterized by the individual’s inability to grasp all that is going on in a moment. Life experiences are simply too complex and dynamic. As William Blake holds, humans tend to filter experience through narrow perspectives and thus miss much of what is happening, especially in settings that
involve human social interaction. To help get around this situation, social science researchers adopt theoretical frameworks in order to open their ‘doors of perception.’ They do so in order to derive meaning and gain insight from social phenomena. Combined with observation, data collection, and analytical methods, theoretical frameworks can operate as powerful ways to reflect upon and interpret human actions.

However, any one theory may expose some things, while leaving others unrecognized. Noting the limitations of any one theoretical view, researchers commonly combine differing frameworks in an effort to further open their “narrow chinks” of perception. Called syncretic frameworks by Gutierrez and Stone (2000), such theoretical marriages bring together particular schools of thought in order to help researchers see things in different ways, and to gain insights into human action perhaps hitherto unseen. To guide my research methods, I employ a syncretic framework to examine the cultural practice of Spades both diachronically (historically) and synchronically (during single occurrences). Gutierrez and Stone (2000) argue that such a framework “makes visible the social and cultural history of the practice, an understanding of what is being accomplished in the moment, and an understanding of the future goal or object activity” (p. 154).

The theoretical framework for the Spades study brings together two theoretical perspectives to gain insight into both Spades as a cultural practice, and player resources. First, I employ cultural historical activity theory (CHAT) as a lens to examine Spades diachronically in order to better situate Spades and the players’
resources within a larger history of African American experience with the game (Gutierrez & Rogoff, 2003; Gutierrez & Stone, 2000). Second, for the synchronic analysis, I employ a play-by-play analysis of single occurrences of Spades games in order to gain insight into the resources that players invoke during play. To aid in the analysis of player resources, I employ Sewell’s (1992, as cited by Elemsky, 2005) theory of structure to closely examine the resources used by Spades players. Sewell’s (1992) theory helps to gain insight into 1) the cultural schemas and resources of the players, 2) the use of such resources as sources of power in social interaction, 3) and how the players have changed, and are changing, the structure of Spades. The combination of these frameworks affords a rich and robust analysis of Spades as a situated, socio-historical practice. To provide the reader with a deeper understanding of these frameworks, and to situate each within the Spades study, a description of each theoretical perspective follows.

*Cultural historical activity theory.* Theories of practice and activity find their roots in Marx’s dialectical materialism. One foundation of Marx’s thinking is the “concept of activity that overcomes and transcends the dualism between the individual subject and objective societal conditions” (Engestrom & Miettinen, 1999, p. 3). Beginning in the 1920s, Vygotsky, Luria, and Leont’ev took on the task of creating a Marxist psychology that dealt with the tension between the subject-object dualism. To do so, Vygotsky (1987) introduced a groundbreaking idea that runs throughout many theories of practice and activity: the mediation of human cognition and action by socioculturally defined signs and tools. The concept of mediation led
to a unit of analysis of mediated action through culturally formed signs and tools. Leont’ev (1981) broadened this unit of analysis by placing mediated action within a broader context of practical activity, a unit of analysis expanded by Cole and Engestrom (1993) in their concept of the activity system. The minimum components of an activity system “include object, subject, mediating artifacts (signs and tools), rules, community and division of labor” (Engestrom & Miettinen, 1999, p. 9).

Activity theory has a number of affordances for researchers who focus upon social and cultural practices as contexts for learning and development. Mainly, it places practice within the complex web of relations that comprise an activity system. According to Engestrom and Miettinen (1999), this move helps researchers to analyze the use of mediating artifacts as cultural resources in local activity systems, while concurrently paying attention to the historical development of these artifacts and resources over time. Paying close attention to social relations involved in activity and the mediation of human action by psychological and material tools helps researchers attend to learning and development in relation to the concurrent development of tools and technology involved in the production of both things and knowledge.

Similarly, Gutierrez and Rogoff (2003) have applied CHAT to explain both the regularities and variations in cultural practices exhibited in individuals’ and groups’ engagement in activity. Their framework encourages researchers to view cultural practices both historically and dynamically, as they change due to any number of influences in an activity system. Further, instead of seeing the commonalities of groups of people as individual traits, Gutierrez and Rogoff (2003)
view human proclivities as repertoires of practice. Following the work of Moll and Greenberg (1990), CHAT also provides a means for the analysis of community-based “funds of knowledge” or “networks [that] form social contexts for the transmission of knowledge, skills, and information as well as cultural values and norms (Moll & Greenberg, 1990, p. 321). Funds of knowledge entail the “broader set of activities which require specific knowledge of strategic importance to households” (Moll & Greenberg, 1990, p. 323). Through engagement in activities, individuals learn knowledge, skills, and the operations of the social networks in which they are an integral part. Through engagement in a wide array of everyday practices, they develop repertoires of practice: the skills, knowledges, and ways of acting and being that are necessary to be a member of a group or community. Focusing upon Vygotsky’s concept of mediation, Nunes’ (1995) framework focuses upon the symbolic systems embedded in the repertoires of practice in which one engages. Nunes’ theory supports the idea that differing kinds of knowledges arise out of repertoires of practice that employ differing symbolic systems.

The diachronic analysis of Spades using CHAT as a theoretical lens was conducted through both a literature review of the history of African American experience with the game of Spades, and through interviews with players. The cultural-historical approach I adopted highlights how African American young men have changed and are changing the game of Spades to meet their purposes and reasons for playing. According to Engestrom and Miettinen (1999), reason, purpose, and goals are significant factors that drive activity systems. Such an analysis sheds
light not only on the reasons and purposes that African American young men play Spades, but also upon the reasons they learn, develop, and employ repertoires of practice related to science and mathematics (i.e., models, model-based reasoning, and other resources). This information will be valuable to teachers or researchers interested in designing culturally relevant, responsive, or affirming pedagogy in science and mathematics classes for African American young men.

Sewell’s theory of resources and power. While the diachronic analysis focuses upon changes in a practice over time, the synchronic lens calls for a moment-to-moment analysis of a practice. Central to the analysis for my study is a focus upon player resources invoked during a game, mainly their forms of reasoning they use to make decisions. Also central is how the players act as agents of change within their Spades playing community at the high school in which the study takes place. The players commit acts of power to change the game in order to maintain levels of status in the Spades community. Interestingly, the players make changes that actually favor their resources. To gain insight into player resources, their acts of power, and how they result in changes in practice, I turn to Sewell (1992).

Sewell’s (1992) sociological theories are an attempt to account for change and transformation in social structures through a complex account of social practices. He argues that although previous frameworks, such as Giddens’ (1981) theory of structuration, account for the reproduction of social structures, they inadequately describe mechanisms through which social structures change. As we know that social structures do change, a theory of social practice must be able to account for such
transformations. In fact, the game of Spades has changed considerably over time (Schademan & Ares, 2006) making Sewell’s theories highly applicable to this study.

As a starting point, Sewell’s theory begins with Giddens’ (1981) view of structure as the rules and resources that comprise and guide social practices. Sewell agrees, but argues that Giddens fails to define these terms adequately, and consequently misses an opportunity to identify the potential engines that drive social change.

Let us first look at rules. Giddens defined rules as the “generalizable procedures applied in the enactment/reproduction of social life” (Giddens, 1981, as cited by Sewell, 1992, p. 8). Building upon Giddens by drawing from the field of cultural anthropology, Sewell views rules as cultural schemas: binary oppositions that comprise tools of thought, or more precisely, the “conventions, recipes, scenarios, principles of action, and habits of speech and gesture built up with these fundamental tools” (Sewell, 1992, pp. 7-8). Further, Sewell (1992) sees schemas as procedures such as “rules of etiquette, or aesthetic norms, or recipes for group action…, or a set of equivalences between wet and dry, female and male, nature and culture, private and public…, or the notion that a human being is composed of a body and a soul” (p. 8). Importantly, Sewell (1992) views schemas as occurring at various levels of depth. Schemas can occur at superficial levels, as in the case of rules of etiquette, but also at deeper levels of structure of the mind as proposed by Anderson’s (1977) cognitive schema theory.

To Sewell (1992), schemas are not rigidly contained within any particular practice, but are generalizable and transportable across practices. This is an important
point, as Sewell’s theory claims that both cultural schemas, as well as the practices in which they develop, are porous, open to change, and can be applied across varying contexts. Creating models or using model-based reasoning as a way of acting in the world in order to make sense of phenomena is a cultural schema. Modeling and model-based reasoning can be learned in one context, and then transposed into novel ones. Gaining proficiency in the ability to build useful models across contexts is an act of agency that can help people accumulate resources.

Resources, the second component of social structures, are a central concept in the Spades study. Importantly, Sewell (1992) ties resources and their use in practice to issues of power, allowing for a definition and an analysis of power that centers on access and the use of cultural resources. Sewell identifies a number of additional characteristics of resources. First, there are two kinds of resources: human and non-human. Non-human resources are produced or naturally occurring objects used to augment or keep power (i.e., physical tools, money). “Human resources are physical strength, dexterity, knowledge, and emotional commitments that can be used to enhance or maintain power, including knowledge of the means of gaining, retaining, or controlling, and propagating either human or nonhuman resources” (Sewell, 1992, p. 9). Culturally derived interactional patterns or communication styles can also be viewed as human resources. Second, resources are unevenly distributed. Third, all people, regardless of their positions, have some control over resources. Fourth, access to and use of resources in social interaction are acts of power. Consequently,
all people, regardless of their social positions, are empowered by access to, and by the use of, resources in one form or another.

Power, from Sewell’s (1992) perspective, which I adopted for this study, occurs through acts of accessing and using culturally valued resources acquired through social and cultural practices. As all people have access to and can use resources of some kind, all individuals have power. However, power is also enacted through the legitimization or marginalization of resources in efforts to augment or maintain power. In this way, contexts in which one’s cultural resources are valued, recognized, and legitimized are empowering. On the other hand, contexts in which one’s resources are not valued, unrecognized, marginalized, or even forbidden are dis-empowering. What drives the legitimization and marginalization of resources is that they are the embodiment of cultural schemas, and accordingly, carry multiple meanings both within and across contexts. In other words, what might be interpreted as a resource in one setting might be viewed as a deficit in another. We saw this situation earlier in this paper in the analysis of Delpit’s (1988) culture of power pervasive in schools. Sewell’s theory is important for the Spades study, as it highlights the intimate connection between culturally valued resources, and issues of power.

Following Giddens (1981) then, Sewell (1992) maintains that structure has a dual nature. Structure is composed of both schemas and resources when they “mutually imply and sustain each other over time” (p. 13). Further, power relations are at work in the use and legitimization of resources. However, Sewell admits that
such a view does little to account for social change through acts of agency. To account for social transformation, Sewell puts forth the following five axioms:

**The multiplicity of structure:** Structures vary considerably across any society, and people move from structure to structure, making their boundaries highly porous. People adopt varying schemas and resources, some of which are compatible, others that are in stark contrast to schemas and resources adopted in other structures. The schemas and resources allocated in varying structures are therefore much more versatile than those envisioned by Bourdieu’s (1990) *habitus*, which is heavily influenced by the objective conditions into which one is born.

**The transposability of schemas.** Schemas can be applied to problems or situations encountered across varying contexts outside of which a particular schema was initially learned. To know or learn a schema is to have the ability to apply it creatively to novel problems or situations. Sewell (1992) links this ability to agency, which he describes as “entailing the capacity to transpose and extend schemas to new contexts” (p. 19), and later transforms this definition to be “the capacity to reinterpret and mobilize an array of resources in terms of cultural schemas than those that initially constituted the array” (p. 19). Sewell holds that agency is inherent in schemas learned competently, as they are transposable across contexts.

**The unpredictability of resource accumulation.** Bringing to bear schemas or resources in novel contexts produces unpredictable results. They may have negligible, minimal, or large effects upon structure and the duration of these effects may change. New schemas or resources are “differentially validated” (Sewell, 1992,
p. 18) based upon the efficacy of their effects. A schema or resource employed in a game of Spades may result in a substantial victory and gain a player a seat at a table with the best players. The player may even be seen as an innovator as the schema is appropriated by other players. On the other hand, the schema may result in the loss of the game, and the subsequent exclusion of the player from the select group of players. Importantly, bringing to bear cultural schemas and resources in novel contexts involves a level of risk, the outcomes of which can be assessed but not accurately predicted.

*The polysemy of resources.* As resources are the embodiment of cultural schemas, they carry multiple meanings interpreted differently by people across contexts. Consequently they can potentially empower different people in different ways. As we saw in Chapter Two in the discussion of teachers’ deficit views of students, teachers were more likely to label students with hip-hop style walks with learning disabilities and behavioral problems. The very resources that help youth gain acceptance and status in their peer groups are seen by many teachers as deficits within school contexts. However, the same youth may use their styles to land a modeling job, by using their movement in ways complementary with a particular style of fashion. From Sewell’s perspective, this is an act of agency: the ability to use an array of resources in novel contexts in which that particular array was not formerly used. These acts of agency are potentially transformative of structure and practice. The power of polysemic resources is therefore found in their creative use across contexts.
The intersection of structures. Multiple structures are continuously intersecting and overlapping, leading to the multiple interpretations brought to them within a particular context. Both schemas and resources can be transposed from one structure to another as they are claimed and put to use in novel contexts through acts of agency.

To Sewell (1992) then, “structures…are sets of mutually sustaining schemas and resources that empower and constrain social action and that tend to be reproduced by social action” (p. 19). But reproduction is not a given, as “structures are multiple and intersecting, because schemas are transposable, and because resources are polysemic and accumulate unpredictably” (p. 19). Agency is constituent of structure, and is inherently a creative process, as it involves applying schemas and resources in novel contexts. As all people have learned schemas and access resources of some kind or another, all people have the ability to affect structural change at some level. However, structures are laden with power differentials that constrain or enhance the extent to which actors can effect change. Further, agency is a relational and collective process, always enacted socially with or in opposition to others. Social positions are collectively defined, and can enhance or constrain one’s personal degree of agency. Therefore, issues of power surround both schema and resource use in any context, leading to varying degrees of how people experience a context as empowering. A context in which particular kinds of schemas and resources are valued might be empowering to some, but disempowering to those who carry with them sets of schemas and resources that are marginalized.
By invoking Sewell’s theory of resources and power in this study, I examine the reasons why the context of Spades is empowering for so many African American young men. In so doing, Sewell’s theory helps to place the resources of the players related to science and mathematics within a context of power relations pervasive in the Spades community. Linking player resources in the form of models and model-based reasoning to power relations may provide insights into how teachers may structure classrooms that legitimize, rather than marginalize such resources.

Complementing the diachronic analysis, an application Sewell’s theory also helps to gain insight into how African American young men have transformed the practice of Spades and how such changes speak to the creative process of transporting resources across contexts. For these reasons, the analysis of Spades using Sewell’s theory opens up possibilities for the future for creating contexts in science and mathematics classes that broaden the kinds of resources considered legitimate.

**Summary.** The syncretic theoretical framework described above is designed to gain insight into the complexity of the practice of Spades, and into the significant resources that the players learn and develop through the game. The diachronic analysis helps us to think about the history of Spades as a cultural practice, situating player resources as repertoires of practice gained though a culturally valued activity. In the synchronic analysis, Sewell (1992) helps us to see the intimate connection between resource use and relations of power, and how individuals can act as agents of social change by using transposable resources across porous practices. Such a view of resources, agency, power, and social change opens up possibilities for the future of
Spades, Spades players, and science and mathematics classrooms. As a whole, the framework opens many opportunities to provide insight into Spades as a cultural practice, and what the practice may teach us about what Spades players value, and how to better bring the worlds of science and mathematics to African American young men.

Research Methods

The Research Question. The overarching question guiding this research study is: What kinds of models or model-based reasoning are learned and developed by African American young men playing the culturally valued game of Spades? The theoretical framework covered in detail above places player models within a cultural, historical, social, and political context. The framework does so by placing models in the cultural practice of Spades, a practice that is intimately connected to the history of African American experience. Further, a view of player resources and the relations of power at work within a Spades community shows how player models involve not just content (e.g., estimation, conditional probability, risk assessment, etc.), but also the beliefs and values of the players, as well as the immediate power relations between players. By creating models that attend to player resources that transcend content, the Spades study seeks to show the intimate connections between the science and mathematics that the players employ, and the beliefs, values, and power relations associated with the game.

Using the analysis of games and interview transcripts, as well as field notes of observations, the contextual models of the game described above are constructed.
Models include the multiple variables that players consider in their decision-making during various stages of the game, the relationships between the variables as understood by the players, as well as the players’ cultural resources that play a central role in the practice of Spades. In this section, I describe the research methods by which I have constructed player models.

Research Setting. The Spades study is part of a larger research project being conducted by Dr. Nancy Ares at a local high school. Called the WideNet Project, Ares’ research examines student cultural practices in mathematics classrooms using networked technologies. As a research assistant for the project, part of my responsibilities has been to observe students in the cafeterias and common area of the school, paying particular attention to cultural practices. During these observations, I noticed the game of Spades at Biddie Mason High School in the spring of 2004 and I conducted observations through the spring of 2007. During the fall of 2006, Dr. Ares encouraged me to pursue an in depth analysis of the practice for my dissertation.

Biddie Mason High School (a pseudonym) in Rochester, NY, is located in a large urban school district that has been designated as the neediest in the state, surpassing districts in New York City, Buffalo, and Albany in the proportion of students who are living in poverty. The New York State Department of Education reported that in 2003, the school served ~2200 students, 60% of whom are African American, 26% Hispanic, 12% white, and 3% Asian, Native American, Alaskan, and Pacific Islander; 36% received free or reduced lunch, and 11% were designated as English language learners. The demographics of the school reflect those of the
surrounding community. Over the last three years, only ~14% of students have received Regents diplomas that lead to post-secondary education, and ~18% were designated “noncompleters.”

Specifically, research took place in the school cafeteria and common area. The school cafeteria at Biddie Mason is divided into two sections, a south side for older students, and a north side for younger students. Initial observations revealed that most Spades players are juniors and seniors, so most observations and interviews took place in the South section. The cafeteria has a typical arrangement for a school built in the late 1950s. The south section is a large rectangular room, with a main entrance on the West end, and food serving lines at the east end. The students eat and play cards at large, brown cafeteria tables that seat 12 people. Spades players typically sit at an end of a table in groups of four.

Groups of Spades players also congregate in the school’s common area, a large open room that adjoins two major wings of the school. The school hallways enter from the east and west. The north and south walls of the room contain large windows with sills wide enough upon which to sit. The north windows look out over the front grounds of the school, while the south windows look out into a courtyard. Rectangular and circular tables line the north and south sills. Students tend to congregate at tables, and along the sills near tables. Spades games occur at tables, while friends and other players overlook from the sills or adjacent tables.

Participants. Research participants were approximately 20 African American young men, and one self-described Mexican-Italian young man, all between 14 and
18 years of age. Participants were selected based upon their consistency of playing Spades and their willingness to be a part of the study. Initial observations indicated that groups play consistently at the same tables over time and with the same collection of players as well. Consequently, I studied games taking place at different tables, but focused my observations for the 2005-2006 and 2006-2007 school years upon two different core groups of players who engaged in the game on a daily basis.

Methods. To explore the research question, I conducted a qualitative study using ethnographic methods including observation of games and player interviews, both taking place simultaneously in naturalistic settings (school cafeteria and common area, each described above). Additionally, towards the end of the 2006-2007 school year, I conducted one focus group interview with a core group of players in order to address questions that arose during data analysis. Further, a number of games and interviews were tape-recorded and the discourse transcribed. To get a better sense of the play of the game, I called games card-by-card into a hand held digital audio tape recorder. By analyzing the transcripts, I recounted the play of the game and the dealt hands of the players. This method afforded a close examination of player strategies, decision-making, and levels of expertise (Ares, Evans, & Schademan, 2008, in review). In order to better understand the game, I purchased a computer-based Spades game and have played over 100 complete games. Experience with Spades helped me to follow and analyze the play of the game, as well as to make comparisons between the traditional game and any versions of Spades played at the school.
Data sources. Data sources include field notes of observations, transcripts of player talk during games and interviews, and notations of the cards played during called games. In general, field notes taken during observations of Spades games consisted of the following: date, location, player names, arrangements of players around the table, the ongoing score of games, game specific terminology, differences between the version of the game and the traditional game of Spades, and records of player decisions and strategies. Transcripts of audio-taped games and interview questions serve as primary data sources to reveal player talk, reasons and purposes of play, decisions, and strategies. Notations of cards played (i.e., Ad = Ace of diamonds, Jc = Jack of clubs) were used to reconstruct the play of the game, the player’s dealt hands, and to gain insight into player decisions and strategies.

Data Collection Procedures. As mentioned previously, I conducted observations of games and interviews for the WideNet Project during the 2005-2006 and 2006-2007 school years. The data corpus consists of audiotapes and field notes of observations and interviews taking place during 29 lunch periods. As a result, I observed 29 different Spades games involving over 100 hands played. Further, I called 13 games involving 676 plays into an audio-recorder. I analyzed these data using the theoretical framework cited above, and the analytical procedures detailed below.

Both observations and interviews (described in detail below) took place in the naturalistic settings of the cafeteria of the common area. For the most part, observations and interviews took place during the time and in the place where the
core group of players engage in the game. At the beginning of the year, mostly field notes were recorded. As the year progressed, and I began to gain rapport with the players, and began to audiotape games and interviews given that each player granted their permission. The focus group interview took place in an unoccupied classroom in the school. I conducted this interview in a classroom to increase player focus on the questions and away from the game. Further, a quiet classroom helped to ensure that player answers could be recorded and transcribed in full without the background noise of the naturalistic settings. One week prior to the interview, I asked a core group of four to six players to attend the focus group interview and emphasized that their attendance is voluntary. I offered the players a free lunch of pizza, drinks, and cookies.

Data recording procedures were as follows. Field notes were recorded in my field notebook. Games and interviews were audiotaped using an Olympus DS-2, hand held digital recorder. Audio files were downloaded onto a laptop computer and accessed using the DSS version 6 software package that accompanies the DS-2 digital recorder. To guard against loss of data, audio files were backed up on the researcher’s external hard drive.

_conducting observations_. How observers position themselves is an important issue in data collection, especially in qualitative research given the closeness in the researcher-participant relationship relative to many quantitative studies. Positioning is also important given that the researcher is the instrument of data collection in qualitative studies (Mertens, 2005). Following Gonzalez, Moll, and Amanti (2005), I
Positioned myself as a learner in the Spades study. Positioning myself as a learner helped to balance the inherent and asymmetrical power relations between myself, a university researcher, and youth from non-dominant groups. Such positioning also sent a message to the players that I valued their practice, as well as their resources, helping me to gain rapport and trust.

Further, I positioned myself as a learner from two perspectives. Initial observations revealed that many of the Spades players were experts. Accordingly, I had much to learn about the game (and still do!), especially about the unique version of the game in which these players engage. From this perspective, such positioning is not problematic. However, I also positioned myself as a learner in respect to the players’ language use, styles of play, and the choices they made in regards to playing the game. In so doing, I refrained from casting my judgments onto the players. For example, initial observations revealed that many players engaged in rule-breaking during play. In regards to such actions, I wanted to know how and why they did so, not to cast judgment upon them, but to better understand the meanings that players drew from breaking the rules, and how such actions operated in their models and reasoning about the game.

In regard to conducting observations, I positioned myself at times as a participant observer, and at other times, as an observer. Such positioning reflects a continuum of levels of participation on the part of qualitative researchers (Spradley, 1980, as cited in Mertens, 2005). Passive participation is when “the researcher is present but does not interact with the participants” (Mertens, p. 382). The researcher
only observes. Goodwin (1990) held that such positioning revealed strong data in her ethnography of the speech of African American children at play. Over time, her participants became somewhat habituated to her presence, as well as to her tape recorder. Accordingly, the children spoke and interacted as if in a naturalistic setting. My positioning myself as a passive participant, I collected data that reflects how Spades is played when I was not present. Moderate participation is an attempt to balance passive and active roles by participating in only some aspects of the activity, but not in most. In active participation, the researcher engages in most of the activities, but not all.

In the Spades study, I moved through these levels of participation in order to collect rich data. My choice of participation level depended upon two factors: the immediate goals of the research, as well as my daily, initial observations of the players’ receptiveness of the researcher’s presence. On some days, I arrived with particular questions to ask. On other days, I arrived with four pre-arranged hands, so that they could play out a previous game in order to get a good sense of their decision-making. Upon approaching a Spades table, I always asked the players if I could join them. If they said yes, I made initial observations concerning their level of receptiveness to my presence by asking myself the following questions: Do the players engage me in introductory talk? Do they address me directly with questions? If I ask them a question, do they respond? If yes, how so? On days in which the players did not seem receptive to my presence, I positioned myself as an observer, recording field notes and recording player talk. On other days, the players were more
receptive to my presence, and engaged me in conversation. I took advantage of such occasions and positioned myself as a moderate or even an active participant observer. I asked them questions about the game, kept score, and even on rare occasions, I played a hand when they extend an invitation. To gain insight into Spades as a cultural practice, I needed to understand the game itself. Moderate and active participation provided insights into the game of Spades that would likely have not been gained from observations and interviews.

*Interviews.* I used both focus group and individual interviews in order to complement direct and participant observations. I conducted mostly focus group interviews, as they most commonly took place during participant observations of Spades games during which at least four players were present. I also conducted brief, individual interviews with players involved in a game. Such interviews focused upon strategies used and variables considered when making a play or a bid. I audiorecorded most interviews, although some were impromptu and consisted of only a question or two for clarification. For such interviews, I simply recorded answers as field notes. The following are some sample questions for such interviews: Where and when did you first play Spades? Who taught you how to play Spades? How did you learn to play Spades? For what reasons do you play Spades? Do you use mathematics in Spades? Do you use science in Spades? Who are the best players at Biddie Mason and what makes them so good? What strategies do you commonly use to win games? Why did you play that card? To date, I have conducted 20 interviews with players, and I am proposing to conduct several more in the fall of 2007 for the
As stated above, I conducted one focus group interview in a classroom with a core group of players. The interview was semi-structured with some open-ended questions. The questions were designed to elicit player narratives to build upon specific aspects of the game revealed in observations and interviews in the cafeteria. Following Mertens (2005), I constructed several questions based upon my analysis. I facilitated the interview as a guided discussion by beginning the interview with an open-ended question about Spades. Then, as the players brought up points that related to other questions in the interview format, I interjected these questions in order to create a flowing conversation. If no context was created by the discussion for an important question, I attempted to establish such a context for the question with introductory remarks to facilitate player readiness for the question.

I also conducted two think aloud, focus group interviews with the players. These sessions were quite fruitful and played central role in my analysis. During these interviews, I gave players hands from games played previously that I had called into the audio-recorder. After analyzing the data myself, I returned to the school, gave the players these hands, and had them play out the hand while telling me their reasons for bidding and playing particular cards.

Data Analysis. The focus of this study is to gain insight into the resources of African American young men, especially those that relate to models and model-based reasoning. In order to place player resources in context, the unit of analysis for this study is the cultural practice of Spades. I have chosen the game of Spades as the unit
of analysis because a number of researchers have found that certain cultural practices support robust forms of learning and development (Lee, 2000, 2001, 2003; Miller & Goodnow, 1995; Majors, 2001, 2003; Nasir, 2000, 2002, 2005). As practices form the contexts for learning and development, it is important to place resources in relation to the practice to avoid the extremes of “individual constructivism and social determinism” (Miller & Goodnow, p. 8). Building upon Vygotsky’s (1987) sociocultural theory of learning, practice as a unit of analysis moves past notions of the individual in isolation by placing the learner in social, cultural, and historical context. However, doing so does not position the learner as a passive receiver of culture and context, but as a potentially creative and active agent by accessing and using resources (Sewell, 1992). At the same time, as Bourdieu (1977, 1990) and Sewell (1992) suggest, asymmetrical power relations exist in all contexts. Using practice as a unit of analysis in conjunction with the theoretical framework allowed for an analysis of the power relations that play a central role in understanding not only what resources are learned, but also the reasons and purposes for learning them.

Using the cultural practices of Spades as the unit of analysis, the data were analyzed using two approaches. First, in order to focus attention upon the resources of players related to science and mathematics, I analyzed a number of games called card-by-card. The analysis comprised reconstructing the entire play of the game including the players’ dealt hands. Each card played was analyzed in regard to the reasons, strategies, and decision-making processes that the players used in order to make a play. In doing so, I gained insight into the players’ models and the model-
based reasoning that they routinely used during the game.

*Building Models.* Through analysis of the interview transcripts, field notes and called games, my project identifies the representational models that include the variables that players consider when making decisions during Spades. Generally, the game involves four phases: dealing, bidding, playing, and scoring. My analysis has identified the multiple variables players consider when making decisions during each phase of the game, and in different situations within the bidding and playing phases. As a result, I constructed representational models consisting of lists of factors or variables considered, player reasoning concerning each factor or variable, and the mathematical relationships between these factors and variables. The analysis using the syncretic framework detailed previously helped to place these models in context, thus resulting in a more nuanced view. For instance, the analysis exposed issues of power in social interaction which may have remained unexamined by a less contextualized perspective.

*Issues in Qualitative Research*

A central concern for qualitative researchers is that of arriving at findings that are trustworthy (Guba, 1981). Such concerns arise out the fact that in qualitative studies, the researcher is the tool or instrument of research. This situation opens up the possibility of arriving at findings that are grounded too little in data, and more in the subjectivity and imagination of the researcher. To guard against this potential problem, Guba proposes five criteria upon which qualitative research can be evaluated: credibility, transferability, dependability, confirmability, and authenticity.
Although Guba proposed these criteria over 25 years ago, current scholars of research methods in the social sciences still draw upon them as standards for qualitative research (Mertens, 2005; Mills, 2007). In this section, I show how, in the Spades study, I attempted to address these issues in order to arrive at trustworthy findings.

_Credibility_. Drawing from Guba (1981), Mertens (2005) defines credibility as “a correspondence between the way the respondents actually perceive social constructs and the way that the researcher portrays their viewpoints” (p. 254). Mertens holds that member checking is central in creating credible research findings. However, initial work with the Spades players revealed some difficulties with member checking. The students were busy all day in classes, and preferred to spend their lunch hours congregating and playing cards, not reviewing my analysis of their games. As a result, attempts at member checking were largely unfruitful, making a sole reliance on it highly problematic. Consequently, for the play-by-play analysis, I analyzed 169 separate plays taking place over 13 games. Focusing upon plays and strategies that players used frequently also increased the credibility of my findings. Further, the think aloud sessions during which I asked players questions about particular plays that were especially puzzling to me, helped me to clarify my analysis increasing the credibility of my findings.

_Transferability_. Transferability is the degree to which the study site and other locations are similar, increasing the likelihood that research findings are applicable across such contexts. Consequently, transferability is to qualitative research what external validity is to quantitative approaches. To increase the transferability of
qualitative findings, researchers need to provide enough detail for the reader to
determine the levels of similarity between the context in the study, and another
context. Mertens suggests that such detail is achieved through thick descriptions
(Geertz, 1973) of contexts, and by analyzing multiple cases or data sources. The
Spades study addresses the issue of transferability by using thick descriptions of
context, as well as the rigorous methods of data collection and analysis, both
highlighted previously. I also supply sufficient detail in the research report for
readers to determine levels of transferability.

Dependability and Confirmability. Dependability concerns the consistent
application of research methods over time. Dependability is therefore akin to
reliability. However, Guba and Lincoln (1989, as cited in Mertens, 2005) hold that
change is expected in qualitative research given that social systems are dynamic. As
a result, researchers need to remain flexible and open to change. To assure
dependability then, qualitative researchers must document changes in methods
surrounding data collection and analysis. Confirmability means that research findings
are not imaginary and can be traced back to their sources (Mertens, 2005). To ensure
both dependability and confirmability in the Spades study, I maintained what Guba
(1981) calls an audit trail, so that all findings could be traced back to their original
sources in transcripts, field notes, codes, and memos.
Chapter 4: Analysis and Results: A Syncretic View of a Cultural Practice

Overview of the Chapter

In this chapter, I present the results of the syncretic (i.e., diachronic and synchronous) analysis of Spades at Biddie Mason. To do so, the chapter is divided into two main sections: the diachronic and the synchronic analysis. In order to provide the reader with a historical context for the game of Spades, I present the diachronic analysis first. The diachronic analysis explores the origins of Spades, along with its predecessor Bid Whist, as well as how the game has changed over time. Most importantly, the analysis highlights how the game has changed within the context of Biddie Mason High since 2004 and how the players have acted as the primary agents of change. Second, I present the synchronic analysis to provide an in-depth view of a single Spades game highlighting the resources and kinds of cognition used by the players. The synchronic analysis also provides insights into how the game of Spades is currently played at Biddie Mason, thus complementing the cultural-historical view. I conclude the chapter with a discussion of the findings from the two analyses, a syncretic view of Spades. The overall purpose of the chapter is to provide a rich context in which the players’ models presented in Chapter Five have developed.

Diachronic Analysis: The Evolution of a Cultural Practice

In this section, I present a historical analysis of Spades and its predecessor, Bid Whist. The analysis highlights how African American card players have changed the games over time, how the Spades players at Biddie Mason continue that history of
change, and the reasons and purposes for the players’ changes to the game. I summarize the primary findings from the diachronic analysis at the end of the section.

A Brief History of Bid Whist and Spades. The diachronic analysis presented in this section revealed a number of changes that have taken place in the games of Bid Whist and Spades since the 1700s. A significant finding is that the Spades players at Biddie Mason are continuing that history in their peer-based community at the school. To provide an overview of this history, Figure 4.1 highlights how the games have changed over space and time over the past two centuries. I describe these changes in detail below.

Spades finds its roots in the game of whist, a popular trick-taking game played in the gambling houses of London in the 1700s (Morrison & Lamb, 2005). European settlers brought the game to America where it went through sufficient modifications to warrant a change in its name to American Whist (Hoekstra, 1883). During the Civil War, Union soldiers brought American Whist to the South, introducing the game to African Americans. According to Morrison and Lamb (2005), African Americans added the practice of bidding and changed the name of the game to Bid Whist. With the help of African American soldiers, sailors and especially the Pullman Sleeping Car Porters whose work took them and the game to various parts of the United States, the game of Bid Whist spread quickly to African American communities across the country where it gained in popularity, especially in the rural south among farmers (Morrison & Lamb, 2005). During the Great Migration from 1914-1950, many
Figure 4.1. The Evolution of Whist, Bid Whist, and Spades.
southern African American farmers resettled in industrial cities in the north to find work. In these urban centers, Bid Whist became a staple of African American family reunions and rent parties: gatherings at apartments where occupants charged small entry and drink fees in order to help pay the rent (Jaynes, 2005). Bid Whist reached its height of popularity in the 1940s and 1950s, but is currently seeing a resurgence, especially on the Internet and on college campuses. Presently, Bid Whist remains virtually unknown outside of African American communities (Jaynes, 2005).

As Bid Whist spread throughout African American communities in northern cities, Spades arose out of the Cincinnati area in the late 1930s (Andrews, 2000); however, it remains unclear whether or not African Americans were involved in creating the game. Regardless, the presence of bidding in Spades bears the mark of African American influence upon the game. Called “baby bid” (Morrison and Lamb, 2005, p. 83) by Bid Whist players, Spades is a simplified version of its predecessor. Currently, Spades is an immensely popular game and ranks as one of the most played card games on the Internet and on college campuses nationwide (Morrison & Lamb, 2005).

The Game of Spades: A History of Change. What I highlight in this section is that the Spades players at Biddie Mason have either adopted or made several key changes to the game of Spades. I argue, based on data and analyses, that the players have consistently made changes to the game for two primary reasons, the first reason being to maintain an advantage over new or other players. Like two organisms caught in an evolutionary arms race, the players make changes that other players need
to adapt to before they can challenge the best players. When other players adapt to these changes, they change the game again or add strategies to which other players must adapt. In so doing, the expert players win a high percentage of their games, maintain high levels of respect within the Spades playing community at the school, and preserve their positions at the best tables. Secondly, the players have made changes to the game to make it more fun and exciting. In doing so, they have increased the number of factors to which players must attend in order to win games. In an effort to make the game more exciting, they have also made the game more challenging, which in turn contributes to the arms race alluded to previously. The result is a dynamic history of Spades at Biddie Mason in which the players act as the primary agents of change.

Spades Play at Biddie Mason. Finding games to observe in the cafeteria or in the Common Area at Biddie Mason High was not a difficult task. Table 4.1 shows the number of lunch periods that I either noted or sat in on card games from October 2005 through February of 2006. During seven different days and nine separate lunch periods, I observed five different kinds of games and fifty different occurrences. Spades was by far the most popular game and African American young men were the most frequent players. Informal surveys of the players revealed that most learned the game at home by initially watching and then playing with family members. Many players stated that it was common practice for their parents or caregivers to get together with other family members or neighbors on weekend evenings to play Spades. Further, community centers in the city host Spades tournaments and weekly
Spades games. Apparently, Spades is a common practice throughout the African American community in Rochester. Given the game’s ties to the community and social life, it is not surprising that the students at Biddie Mason engage in the activity and that they have reached high levels of expertise in the game.

Table 4.1. Informal Survey of Game Playing at Biddie Mason High.

<table>
<thead>
<tr>
<th>Games</th>
<th># of Games</th>
<th># of Players</th>
<th>African American M</th>
<th>African American F</th>
<th>Hispanic M</th>
<th>Hispanic F</th>
<th>White M</th>
<th>White F</th>
<th>Asian M</th>
<th>Asian F</th>
<th>Other M</th>
<th>Other F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunk</td>
<td>16</td>
<td>34</td>
<td>31</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spades</td>
<td>25</td>
<td>96</td>
<td>88</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yugioh</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uno</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>151</td>
<td>130</td>
<td>12</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The Multiple Versions of Spades. By combining data from literature searches, direct observations of games, by playing Spades myself, and through interviews with players, I have discerned three versions of the game of Spades. Traditionally, Spades is a 4-person, 2-team card game. Similar to Bid Whist and bridge, it is a trick-taking game (4 cards/trick, 13 tricks per deck) in which “every player puts one card from his or her hand into play. … Once each player has played a card to the trick, they are turned face down and removed from play” (http://en.wikipedia.org/wiki/Trick-taking_game). Spades ‘trump’ or outrank all other suits in taking tricks; the higher cards within suits outrank lower cards (e.g., king outranks ten). Further, Traditional Spades is an “Exact-prediction trick-taking game … [that rewards] players for
predicting (usually after knowing their hands) how many cards they will take”.

Teams that accumulate ten tricks or ‘bags’ above their bids lose 100 points from their total score. Games begin with a round of bidding (no minimum bid) during which players announce how many tricks they think that they will take. Partners add their bids together and work cooperatively to achieve their bid. Thirteen tricks are possible, though in some games, more than thirteen tricks can be bid. If a team does not make their bid (i.e., gets set), they loose a total of ten times the number of their bid. Most games are played to 500.

According to the players at Biddie Mason, members of their communities outside of school engage in all three versions of the game: traditional, Old School and New School Spades. Primarily, the three versions are distinguished by differences in the number of spades in the deck as well as other rule changes covered below. For the most part, the players’ caregivers play the Traditional and Old School versions of the game whereas the students play New School Spades during their lunch period at school. Both old and New School Spades players have changed the game by adding trump cards. In Old School, the trump cards are as follows, listed in order of decreasing strength: big joker, little joker, two of diamonds, two of spades, and then the ace down to the three of spades. Two threes are removed from the deck in order to maintain a total of 52 cards.

*New School Spades: An ‘Arms Race’ in a Local Community of Practice*.

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8 Throughout the following sections, I use a narrative style of reporting interspersed with data sources such as transcripts from interviews and data tables. I do so to support my analysis and findings with evidence to maintain their trustworthiness.
During interviews, the players revealed that they played Old School Spades when they first arrived at Biddie Mason as freshmen. During a focus group interview, the players related that one student introduced New School Spades into the community during their freshmen year and that they have been playing that version of the game ever since. In New School, the trump cards are as follows: big joker, little joker, deuces of each suit (hearts, clubs, diamonds, spades), then the remaining spades in descending order with ace being high. The addition of spades to the deck increases the probability that each player may be dealt spades. The players claim that the addition of spades makes the game more fun, as it increases the chances of getting good hands and that each player can take tricks.

The addition of spades requires a learning period in order to master New School Spades, as the ranking of the spades (i.e., BJ, LJ, 2h, 2c, 2d, 2c…)\(^9\) is not intuitive. Memorizing the order is thus confusing to novices. Jonah described his learning period like this: “When I first started playing, when I first started playing Spades, it was last year, I didn’t know like, the order of the deuces, so that messed me all up…”\(^10\) A novice New Schooler then, not only makes mistakes, but is also less capable of attending to the cards played than those who have mastered the ranking of the trump cards. Opponents, to whom the non-intuitive order of the spades is second nature, can therefore focus on the cards played and capitalize on mistakes made by

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\(^9\) Throughout the paper, I use these abbreviations for simplicity. For instance, BJ is for big joker, LJ is for little joker, 2h is for deuce of hearts, etc.

\(^10\) I include transcripts of player talk in order to foreground their voices in the analysis. I closely transcribed player talk and present their language as recorded in order to maintain the authenticity and originality of the data.
distracted players. However, Jonah is now one of the best players at the school showing that novice players, once they master the order of the spades, can compete with the experts.

New School Spades players have also eliminated bag limits from the game. Bag limits are penalties for taking books in excess of a team’s bid. In the Traditional Spades, 100 points are deducted from a team’s score when they exceed ten bags over their bid. The elimination of bag limits changes the game dramatically. In Traditional Spades, players often throw away high cards for two reasons: to avoid exceeding the bag limit and to get the opposing team to go over their bid, placing them in danger of losing 100 points. Additionally, bag limit rules make setting your opponents, or preventing them from making their bid, much more difficult by inhibiting teams from taking books in excess of their bid, a strategy used to set the opposing team. Although Traditional Spades play requires much strategy, the dumping of high cards to avoid bag limits makes for a more conservative game than New School Spades. Conversely, New School Spades is about taking as many books as possible in order to maximize your team’s score while setting the opposing team. In New School, a team’s best defense is a good offense: taking lots of books increases the chances of setting opponents. Scoring big, while setting the opposing team, can lead to large margins of victory. According to my observations and interviews, this type of aggressive play makes the game more fun and exciting for the Spades players. The players often express their excitement by slamming or smacking cards on the table, especially when a player takes a trick (or a book as the players call them) with
an unexpected trump card.

Further, freed from the constraints of bag limits, players can bluff or underbid in an effort to encourage overbidding by opponents, placing them in a situation to be set for large numbers of points. When I asked the players about advanced strategies, Abe identified underbidding as one such strategy (The players describe Abe as “the master of the underbid.”). In most cases, players who bluff will bid low, even though they may have high cards, in order to get the opposing team to bid high. In any one hand, a total of thirteen books will always be taken. If a bluffing team bids only four books, nine books are left to take. Players will often bid higher in this situation than normal given that the opposing team has bid low. The high bidding team, the victims of the bluff, are placed in the vulnerable position of being set for a large number of points (ten times their bid). Consequently, a successful bluff can change close games into blowouts and vice versa.

However, Sid highlighted the limits of the underbid strategy by stating: “Last year [Abe was beating us], but then we started beating him… Hold up. That’s why we used to lose. Everybody used to always underbid against him and Kenny, and we always used to just either get double set or, they just be stupid and pointless.” Although the underbid can be an effective strategy, the players adapted to it by using it against Abe and by predicting his underbidding, as to not fall prey to the tactic. As with the order of the spades highlighted above, novel rules or strategies have a shelf life, as the players become familiar with them and create tactics designed to counter the strategy.
Breaking the Rules: Just a Part of the Game in New School Spades. But what if a player or team is not dealt strong cards? Getting a weak or mediocre hand is common in New School Spades, even with 18 trump cards. Rather than simply lose the hand, the players have changed the rules and have devised strategies for such cases. First, they have changed the rules by setting a minimum bid of four (going board) for a team. If a team is dealt a hand with which they cannot go board, they have the option of asking for a new deal (throwing in the hand). Such a change in the rules prevents the luck of the deal from determining outcomes of a hand, placing a greater emphasis upon strategic play. Second, the players use particular strategies to make the best possible uses of their relatively low cards, something we will examine in detail in the synchronic, play-by-play analysis. Third, and most important to the players -- evidenced by the large number of references to it in focus group interviews -- many expert players routinely break the rules of the game in order to win. It is important to consider that many players do not view rule-breaking as cheating per se. Instead, they see such strategies as part of the game if a player wants to win when they have weak hands. The players described rule-breaking like this:

Jonah: Cheatin. It’s not cheatin’. I’m not goin’ to call it cheatin’.

Nope. It’s not cheatin’, it’s playing Spades. It’s the game.

Moe: It’s entertainment.

iPod: It’s a part of the game. You gotta take a chance, you gonna get caught, or you don’t and then the chance that you get caught, you lose three, you lose, damn, yea.
Jonah: It’s like street fightin’. You could pick up a brick and hit
someone with it. But that’s not cheatin’. That’s street fightin’.

iPod: That’s part of street fightin’.

Jonah: Renegin’. Part of Spades.

The players appear to rationalize rule-breaking by considering it as part of the game. In fact, the players have incorporated rules for rule breaking into the game. For instance, iPod’s comment above alludes to how the players have appropriated a practice from our judicial system: a player is innocent until proven guilty. The burden of proof is placed upon the opposing team to recognize rule breaking, and then to prove it by providing evidence, which is not always an easy task, as we shall see below. Ironically, the rules of New School Spades favor the rule-breakers, and as we will also see, it is much more difficult to catch a rule-breaker than it is to break the rules. Before further analysis of rule breaking can take place, it is necessary to detail what constitutes cheating in Spades.

One of the main rules of Spades is that players must follow the suit of the lead card (the first card played in a round). If the leader plays a heart, players must also play hearts. In the event that a player does not have a heart, he/she may play trump or another suit. Reneging occurs when a player does not follow the suit led even though he/she has cards in the suit in his/her hand. Of course, reneging most often occurs by playing a spade instead of a card of the suit led.

Here is an example of reneging from a game that took place on April 23, 2007. Kevin and Jonah (K&J) are playing against Munch and Jason (M&J). After
the fourth hand played, K&J are leading the game 470 to 230. Before looking at their cards during the deal of the fifth hand, M&J announce that they will go double blind\footnote{In Traditional Spades, rulebooks include blind six and/or blind seven (See http://herbison.com/herbison/spades_rules.html and http://www.pagat.com/boston/spades.html). In these cases, players receive 120 points for making their bid (i.e., six or seven) made before looking at their cards. In New School Spades, the players can go single blind when down by at least 100 points to score 140, or double blind when down by at least 200 points to score 240. In either case, they lose 70 points if they do not make their bid.}, a strategy used when a team is down by 200 points or more. Going double blind entails bidding seven books before looking at the cards. If a team going double blind makes their bid, they earn 240 points, a score that can easily get a team behind by a large margin back in the game.

During the fourth book of the hand, Jonah leads with a jd Jason follows with a qd, Kevin trumps with a 5s, and Munch follows suit with a 7d. Kevin’s 5s appears to be a clean play until we examine his hand (5s, kc, jh, qs, 10s, 5d, 2h, 6h, ks, LJ). Notice that he is holding a 5d but played the 5s instead. That is a renege. Next, Kenny has to strategically play the 5d so that it goes unnoticed. To do so, he waits until five plays later. In a focus group interview, Jonah commented that reneging takes skill, and we see that here. Kevin not only had to determine when and in what suit to renege, then he had to strategically play his 5d, as to go unnoticed by his opponents. As M&J appeared not to notice, his renege goes unchallenged. Unfortunately for M&J, the renege made the difference: they needed seven books for their double blind but only got six. As a result, they lost 70 points rather than gaining 240, a severe blow as they were already well behind K&J.
What Kevin’s play suggests is how important reneging is to the players: they can win games even when they do not get strong cards. In Spades, a player can only do so much with a weak hand. In such cases, they typically must follow suit, as the players with the strong hands largely determine the outcome of the game. Rather than simply following the lead, the players have brought the practice of reneging into their school community, a practice that requires risk and skill to master. Kevin takes the risk playing against Munch and Jason, who although are good players, do not typically play at this table. He demonstrates his mastery of the skill by choosing to renge at an appropriate time with a suit in which he only has one card left. He then waits until an appropriate time to play the 5d, and does so by leading the card. He knows that diamonds have been played twice, and with Jonah in third position, he may trump and take the book. Although Jonah does not trump, Kevin was more than likely considering this option.

The skills involved in reneging pale in comparison to those needed to catch a player engaging in this practice, especially in this local community of practice at Biddie Mason. Although not fully successful in catching Jonah’s renege in the next hand, Jason demonstrates how reneging, and the rule changes that the players have adopted around the practice, have substantively changed the game and have added to its complexity. The players play the following cards in the sixth book of the following hand: Jason, jh; Kevin, 10d; Munch, qh; Jonah, 4s. Since hearts is led, and Jonah has a 9h in his hand, this is a renege. Joe suspects Jonah’s renege during the next book when he says, “I forgot which book it was.” What he meant was that in
New School Spades within this community, it is not sufficient to catch someone reneging, Jason must also identify the exact book containing the renege (the book with the 4s in this case) from the opposing team’s stack of books after Jonah plays the 9h that he is holding. As the books are face down, they all look the same making identifying the correct book a difficult task. Just three plays later, Jonah leads with the 9h. Here is the conversation that took place immediately after the play:

   Jason: He’s a cheatin’ ass nigga!
   Jonah: I just told him what book it was, too.
   Jason: [Laughs.]
   Jonah: But if you’re gonna pull it, you gotta pull it now, though.
   Jason: I know.

In part, Jason demonstrates the skills required to catch Jonah reneging. He waited for Jonah to play the heart that he did not play previously. However, he was unsuccessful at proving it, as he had to attend to three things: the cards being played by all of the players so that he can decide what cards to play, Jonah’s heart, and to Jonah’s face-down won book containing the 4s, the card that he played when he reneged. What makes this such a difficult task is that Sid, one of the other expert Spades players, introduced a novel strategy into the game during the previous year that he and his fellow players have since perfected: switching their won books around during play. Here is how the players talked about this practice:

   Abe: You switch the books when you don’t renege. So you don’t be paying attention.
Al: What’s this now?

Abe: [Sid]. He switch the books, and even if he ain’t reneged. So you don’t pay attention to the game, you pay attention to him, and you fuck up.

Al: Oh right.

Jonah: Or like, yea.

Abe: He be like that all the time.

Al: So it’s kind of like a distraction. A distracting behavior.

Abe: Yea.

Jonah: And you never know when he’s renegin’.

Sid: I just do it normally though. I never knew it had an impact until people started just paying attention to the books.

Al: Right.

Sid: Then I seen oh, they be sick out here.

Moe: I didn’t know where that shit came from. I was watching these niggas play one time this year. These niggas had, he started lining up different and shit. That shit just came out of nowhere.

iPod: I had to.

Jonah: When I get a book, I’ll separate them like this, and then when I win a book for real, I just like put’em together some different way.

Moe: Yea. I didn’t know where that came from.
So we learn that Sid actually invented the strategy by watching the behavior of other players while he did something that just came naturally to him, perhaps a nervous habit. His behavior, which developed into a strategy, is like a shell game: continuously moving books to hide the reneged card from his opponents. Sid’s strategy makes identifying the correct book on the first try (a rule in New School Spades) very difficult. Not only does the strategy succeed in hiding books, it also creates a distraction increasing the likelihood that opponents will either make mistakes or miss opportunities, as they fail to pay attention to which cards are played by which players. As we will see in the play-by-play analysis, such information is vital to helping players take books with the lowest cards possible. In the example above, Jason fell prey to this strategy, and was not able to pull the right book from Jonah.

As with the two examples of changes to the game presented previously suggest (adding spades and underbidding), opponents eventually learn novel strategies like reneging and switching books and meet them with counter strategies. When asked what it takes to be a great Spades player, here is how the players responded:

iPod:  Gotta be blood.

Moe:  You gotta know the cards, man.

iPod:  To be a great Spades player? Yea, kinda. You gotta know like what’s be played.

Jonah: How many cards are in the deck. What’s been played.
Sid: Sometimes you actually do have to count the cards. They be trying to cheat.

Moe: He was like, he was like, hold on, “You reneged”.

Jonah: He counted the cards and he was like, “Boy, should we renge.

Switch them shit”.

Al: So part of it is catchin’ other people cheating, and that’s what knowing the cards means?

iPod: Yea.

Sid: Now everyone getting good at it.

Jonah: I picked it up this year from him (points to Sid). He always be moving them books. And him too. [Abe]. He’ll set the books out separately, and he’ll put two books on top, he’ll just put’em all together some different way.

The players appropriate strategies from other players, use the same strategies against their innovators, and construct counter strategies as well. In this case, the players begin reneging and switching books, and then count cards so that they can accurately determine when their opponents are reneging. If a player can make such a determination successfully, they at least have a chance of pulling the correct book even given Sid’s shell game tactic. If successful, the reneging team loses three books often resulting in getting set and losing a total number of points ten times their bid. In an interview, Sid expressed his discontent with the latest tactics in the continual arms race, to which he has contributed, by asking the question: “How could we do it
without cheatin’?” He appears to be searching for the next novel strategy, or way of changing the game, that does not involve cheating and is unknown by the players in this community.

New School Spades Players as Agents of Change. The analysis presented above shows how the Spades players in this community have extended the play of the game, which can get routine, beyond the traditional boundaries of play in order to make the game more fun and challenging. It not only pushes the boundaries of the game, but also the abilities of the players, as the practices of adding spades, bluffing, reneging and switching books creates more factors to which players must attend in order to win games. In this way, the Spades study supports Nasir’s (2000, 2002, 2005) analysis of basketball and dominoes when she found that as games and their contexts evolve over time and across contexts, the demands placed upon the players increase, leading to higher levels of cognitive development. Such a corroboration of findings highlights the importance of engaging in historically developed, culturally valued practices like Spades, basketball, and dominoes for the cognitive development of African American youth.

However, the changes to which Nasir attends are largely contextual. For instance, basketball takes on an increasing level of importance to the community and to the players as they move from middle to high school. The stakes become higher in high school as the level of competition increases and college recruitment begins. As a result, Nasir found that the players appropriate more rigorous ways to assess both team and individual performance through more and more complex statistics.
However, within the Spades community at Biddie Mason High, the players are the active agents in the change process. The expert players are the leaders of this community and introduce the kinds of changes to the game highlighted above. The players hold that such changes have greatly improved the game. Additionally, these changes go beyond novel strategies and rule changes, but also extend into a discursive space:

Jonah: We made the game better.

iPod: Yea. Cause. Looking at the cards. Seeing what people have.

Abe: There be a whole bunch of other people in this school that when you watch’em play Spades, it wouldn’t be as fun as watchin’ us.

Moe: Yea, it be mad boring.

iPod: Ours is more exciting.

Moe: That game be dry like, if we playin’ a dry game, I’ll stop playin’. I take my hand.

iPod: Cause we talk a lot of shit. Everybody at our table.


iPod: Yea.

Jonah: Our dialogue makes the game fun.

Al: Really?

Moe: We blood. The way we talk!

Jonah: If you sit there and go like this the whole game: Win book.
iPod: Uh huh.

Jonah: It’s so boring.

iPod: Yea right.

Jonah: I’m gonna beat your ass!

The players are essentially saying that Spades play at other tables is not as exciting or fun, as others do not engage in the kinds of the dialogue that makes the game more enjoyable. The dialogue to which Jonah refers is a familiar and ubiquitous practice in African American culture and is tied closely to Bid Whist and Spades. Morrison and Lamb (2005) hold that “Bid Whist is a friendly game, but not a polite one. You’re supposed to talk trash, sell wolf tickets, play the dozens, blaze’em, kill’em, diss’em. Get the point?” (pp. 18-19). One of the few young women who play Spades during school at Biddie Mason describes Spades as “the best way to have fun and talk junk at the same time”.

In addition to dialogue, the players use Spades specific terminology. Table 4.2 shows a number of terms and their associated meanings uncovered through interviews and in analysis of field notes. Given the ties of Spades to home and community, it is likely that students learned many of these terms from their mentors. For instance, the term “book”, which is used to describe a “trick”, originated with the original Bid Whist players during the Civil War period (Morrison & Lamb, 2005; Tye, 2004). However, given the dynamic, creative, and imaginative perspective towards language of many African Americans within the urban youth hip-hop
### Table 4.2. Terminology Used by Spades Players

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book</td>
<td>One round of cards when each player plays one card. The team makes the book.</td>
</tr>
<tr>
<td>Whuppin', whuppin' ass</td>
<td>Two meanings: (1) beating another team badly by a large margin. (2) the last card played in that round, especially when the other team has bid the book.</td>
</tr>
<tr>
<td>Smackin or slammin</td>
<td>Slapping a card down hard on the table.</td>
</tr>
<tr>
<td>Going Board</td>
<td>When a team can only bid four books.</td>
</tr>
<tr>
<td>Six It Up</td>
<td>When both teams bid six books.</td>
</tr>
<tr>
<td>Garbage Hand</td>
<td>When a team can only go board.</td>
</tr>
<tr>
<td>Bubble or Spin'em</td>
<td>Bidding and winning ten books.</td>
</tr>
<tr>
<td>Two for Ten</td>
<td>The team gets 200 points if ten books are bid and won.</td>
</tr>
<tr>
<td>Braggin</td>
<td>Players visit other tables of card players to show how much they dominate the largest margins.</td>
</tr>
<tr>
<td>Layin' off</td>
<td>Player has a high card, but lays a low card for various reasons, to save stronger cards.</td>
</tr>
<tr>
<td>Set</td>
<td>A failure to make your bid.</td>
</tr>
<tr>
<td>Cut</td>
<td>When a high card, like an ace, loses its strength by being played down.</td>
</tr>
<tr>
<td>Turning</td>
<td>Cheating, mostly in the form of teammates communicating about the hand.</td>
</tr>
<tr>
<td>Got some fire</td>
<td>A good hand: aces and kings of any suit, high spades.</td>
</tr>
<tr>
<td>Getting behind</td>
<td>Gaining position on someone in order to decrease their likelihood to make their bid.</td>
</tr>
<tr>
<td>The hand bets itself</td>
<td>No bidding on the first hand in a game.</td>
</tr>
<tr>
<td>Throwing in the hand</td>
<td>When a team cannot go board, the hand is discarded and the deal passes.</td>
</tr>
<tr>
<td>Stuck</td>
<td>Used during the bidding process when a team suspects that the other team will bid books then they can possibly take.</td>
</tr>
<tr>
<td>Talking across the table</td>
<td>Teammates communicating about the cards they are holding.</td>
</tr>
</tbody>
</table>
movement (Morgan, 2002; Smitherman, 1999), it is also likely that some of these terms may have arisen locally within the peer communities at Biddie Mason. Regardless, in addition to the rules and strategies highlighted previously in this section, Table 4.2 represents a language that must be mastered to achieve any level of competency in the game in the service of gaining and maintaining one’s status as a Spades player.

*Spades as a goal-directed activity/practice.* In addition to gaining an understanding of the dynamic nature of practices as they are changed over time by their participants, a cultural historical lens challenges researchers to examine the reasons and purposes, as well as the tensions and contradictions, that drive activity systems or practices (Engestrom & Miettinen, 1999). Questions for this analysis thus become: 1) what are the reasons and purposes that drive the continuous change taking place in the Spades community at Biddie Mason, and 2) what tensions and contradictions arise in the Spades playing community and how does the changing nature of Spades relate to their resolution? If we look at the literature on games, people play and change games to keep them enjoyable (Goffman, 1961). When a game ceases to be fun, a person has two choices: they can either quit playing or change the game. The above analysis demonstrates that the young men in this study have chosen the latter. They have made this choice to resolve a tension, as it would be contradictory to continue to play a game that ceases to be fun.
Ultimately, a player can only get so good at a game, and the players at Biddie Mason, after playing hundreds, perhaps even over a thousand hands of Spades, have become experts. It is safe to assume that players such as Kevin, Jonah, Abe, iPod, and Sid, six regulars at the table considered to be inhabited by the best players, are about equal in their levels of play. As they are essentially operating on a level playing field, the cards dealt (or luck) become the greatest determining factor of the outcome of the game. This places the players in the passive position of simply following suit, walking a predetermined path that has been laid out before them by the cards. The players refuse to accept this position, as the game fails to be enjoyable and playing it would be contradictory. Instead, they choose to change the game in order to resolve the continuously arising tension created by boredom and conformity. When the rule structure can no longer be changed (how many more spades could actually be added?), they resort to strategies like underbidding, reneging, switching books, and rich dialogue to keep the game fresh and enjoyable. Such a finding supports a central tenet of activity theory: that tensions and contradictions, and attempts at their resolution, drive activity systems (Engestrom & Miettinen, 1999). Interestingly, the players' apparent rationalization for cheating (reneging is part of the game), upon further examination from a CHAT perspective, becomes a justification. Rule-breaking is justified as it has become part of the game through a resolution of a tension, one that if not resolved, would likely result in the dissolution of the Spades community: the players would stop playing and the community would lose its raison d’être.
However, the focus upon enjoyment misses another central reason and purpose for playing Spades for these young men: to gain respect within their peer groups and in the Spades playing community at Biddie Mason. Enjoyment is certainly one of the reasons cited by the players for playing the game, but gaining respect is another. Within peer groups that play Spades, pecking orders around status related to the level of expertise at Spades is evident. One of my initial forays into the Spades community during the 2005-2006 school year at Biddie Mason was through a group of African American young men self-proclaimed as “The Best in the Business.” The players knew who were the best players and the best teams. Chad, Bigs and Lewis considered themselves the best players. Kasim, Joe, William and Atlanta, while competent players, did not consistently play at the level of “the best.” When asked why he played Spades, Lewis proudly responded “When you the best at something, its you know…I mean its just that good.” Clearly, expertise at Spades acts as a powerful marker of status within this peer group.

Further, in a focus group interview from the spring of 2007, the Spades players related a similar pecking order.

Al: Alright. Um. Why is it so important then, to, to win? Okay. Cause you guys are like basically you don’t get the cards so you do all these strategies to cheat so you can win. So why is that so important?

Abe: So you can be the best.
iPod: I would say you don’t want everybody else braggin about how they be spankin you all the time…

Moe: I think it makes high school easier.

iPod: …how you be losin’, how you don’t ever win the game.

Moe: Gives us something to do in school.

Al: Okay. So talk goes around after these games, right?

Moe: Yea, don’t nobody want to be a loser.

?: Oh yea.

?: Yep.

Al: So talk to me about that. You sort of gain respect, right?

iPod: Yea.

Trace: Something like that.

iPod: You get respect. I like. I don’t think, I say, if I, if you had to choose a team, I pick [Sid] over [Trace] cause I believe…

Trace: Hey, I’m learning, I’m learnin’, I’m learnin’.

iPod: …[Sid] is a way better. Like, if I had to choose any body in this room, it’d be outta these two boys…

Moe: It’s like confidence. It’s confidence in your team.

iPod: …right here, Jay Boys and Quinten.

Al: So as you gain…

Moe: I think [Abe’s] the best though.

iPod: No. Abe?
Sid: We blazin’ Abe nowadays.

Al: So you gain respect, you get better partners.

iPod: Yea. Pretty much.

Al: And you win more games.

iPod: Pretty much.

Clearly, being the best, gaining respect, and staying at the top of the heap are of great importance to these players.

Several studies have cited the importance of respect as a form of symbolic capital for African American and urban youth (Elmesky, 2005; Elmesky & Tobin, 2005; Seiler, Tobin, & Sokolic, 2001). Drawing from Bourdieu (1992), these researchers view respect as a form of currency that can be exchanged in social relations for other forms of capital, both social and cultural. In the case of the Spades players, respect is a currency used in exchange for securing expert partners, which in turn, secures the players’ seats at the best tables. Gaining expertise at the game, acquiring respect as a form of symbolic capital, and exchanging it for partners results in something akin to a positive feedback loop: as a player gains respect, they acquire better partners, helping them to consistently win games, which in turn, begets the player more respect. The comments made above by Sid and iPod concerning Abe’s overuse of underbidding demonstrate how delicate a player’s status can be in this community. Abe attests to this fragility in his poignant comment below:

Jonah: I just started playing Spades last year.

Moe: I didn’t even think he knew how to play.
Jonah: Fat ass taught me.

[Laughter]

Abe: I did.

Al: Are you regrettin’ that?

Abe: Naw. I didn’t know.

iPod: Last year [Abe] used to play with you and [Kevin].

Abe: Yea, we used to whup your ass everyday.

iPod: Stop frontin’, not everyday.

Abe: [Sid] and me used to be the dynamic duel, then you stole my partner, and I’m the lone wolf.

Apparently, Abe’s overuse of the underbid strategy, which Sid claims caused them to begin losing games, cost him his partner and a considerable amount of respect at the expert table. Abe’s story demonstrates the importance of the need to attend to the constant arms race going on within the Spades community. As the other players catch on to a player’s strategy, they must be able to adjust accordingly or begin losing games, something not tolerated for long by players like Sid. Attending to the dynamic nature of this community, a dynamism created by the players themselves, is of utmost importance to a player maintaining his status and respect in the community.

Summary of Findings. The diachronic analysis has revealed three significant findings. First, the players have changed the game of Spades significantly. These young men therefore display the ability to innovatively and creatively make changes to a cultural practice that dates back 150 years in African American culture. Second,
the players have either adopted changes or have changed the game for two primary reasons or purposes: 1) to make the game more fun and enjoyable and 2) to gain respect and maintain status in the Spades community. Changing the game to make it more fun prevents their version of the game, and therefore the Spades community, from dissolution. Such changes also make the game more challenging by increasing the number of factors to which players must attend. In doing so, they perpetuate an arms race in a cultural practice in which the innovators of change are the first to master such alterations, providing the expert with an advantage over their opponents. Maintaining an edge over the competition further allows players to attract better partners, further cementing their status as experts: the best players in the Spades community at the school. Third, as shown by the historical analysis, Spades is a highly valued cultural-historical practice in African American communities. Maintaining a high level of respect and status within a community that centers around such a valued cultural practice helps us to understand why these young men commit so much time and effort to learn and develop the resources required to become experts at this game. In the next section, the synchronic analysis reveals specific resources that the players use, learn and develop through the game.

A Synchronic Lens: A Play-by-Play Analysis

To complement the diachronic analysis presented above, I now present an analysis of a single game of Spades. The analysis highlights a number of resources that the players use in order to win games and the strategic kinds of cognition they use. Unlike the diachronic analysis that focused upon change in the practice across
both time and space, the synchronic analysis takes an in-depth view of a single game of Spades in order to gain a deeper understanding of the resources and kinds of reasoning that the players use during play. In so doing, the synchronic analysis lays the foundation for the modeling analysis presented in Chapter Five, as it begins to uncover some important forms of reasoning that relate to science and mathematics.

*Play-by-play Analysis.* I audio-recorded the game, card-by-card, shown below in Table 4.3. The notations stand for particular cards (i.e., ac = ace of clubs; LJ = Little Joker, etc.). Each line read left to right represents the dealt hand of each player and each column represents each trick (or book, as the players call it). Cards in bold type represent the lead card played in each book. After completing my own play-by-play analysis of the game, I reconstructed the actual hands using a deck of cards. During a focus group interview, the players replayed the game and shared their reasons for playing particular cards. I was especially interested in plays that were puzzling to me both as a researcher and an amateur Spades player. The order of play for the first book is Kevin, Moe, Abe, and Sid. Kevin and Abe are partners, and they are playing against Moe and Sid. Moe was not present at the interview, so Jonah took his place.

I begin with the analysis of the first book of the hand displayed above. Kevin led the first book with his ace of clubs. Ace leads early in the game are typical. As Kevin states: “Cause, that’s my only ace, pretty much. It’s my first book.” Sid adds:
“Well usually, it’s a definite book.” Players lead aces early as the probability is high that all players are holding at least one or two cards in each suit. As a result, an early ace lead almost always takes a book. The other players throw low cards in the suit, but hold onto their higher cards in hopes that they might take a book. However, Sid, who played the 9c in the original game, was going to play a jc during the interview. This is how he explained his new strategy: “I was gonna play the jack so I could play a little bit high, but not low, so they be like, well he got a lot of them over there. You gotta try to confuse.” Sid wanted to play the jack in order to make other players think that he was holding fewer clubs. The higher the card a player throws off, the fewer cards in that suit he typically has. If players knew that he was holding many clubs, they could have exploited this weakness. For instance, knowing this might tell an opponent what cards their partner is cutting (i.e., playing trump). If Sid has many clubs, his opponent’s partner may have a small number of clubs or none at all. So even when following suit, expert players like Sid often play cards strategically to either hide, or in some cases reveal, what they are holding.

Table 4.3. Spades Game - March 3, 2007

<table>
<thead>
<tr>
<th>Player</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kevin</td>
<td>9h</td>
<td>4c</td>
<td>7c</td>
<td>6d</td>
<td>3s</td>
<td>10d</td>
<td>7s</td>
<td>8c</td>
<td>2d</td>
<td>8s</td>
<td>as</td>
<td>10s</td>
<td></td>
</tr>
<tr>
<td>Moe</td>
<td>10c</td>
<td>qh</td>
<td>6s</td>
<td>4h</td>
<td>9d</td>
<td>7h</td>
<td>kd</td>
<td>qd</td>
<td>js</td>
<td>jd</td>
<td>2h</td>
<td>LJ</td>
<td>5d</td>
</tr>
<tr>
<td>Abe</td>
<td>6c</td>
<td>kh</td>
<td>qc</td>
<td>jh</td>
<td>ad</td>
<td>8h</td>
<td>8d</td>
<td>3d</td>
<td>5c</td>
<td>6h</td>
<td>qs</td>
<td>2c</td>
<td>ks</td>
</tr>
<tr>
<td>Sid</td>
<td>9c</td>
<td>ah</td>
<td>jc</td>
<td>5h</td>
<td>7d</td>
<td>10h</td>
<td>4d</td>
<td>kc</td>
<td>4s</td>
<td>2s</td>
<td>5s</td>
<td>9s</td>
<td>BJ</td>
</tr>
</tbody>
</table>
In the next play, Kevin, who took the first book with his ac, leads a 9h. Early in the hand, players often lead a low card in hopes that their partner has the ace, a 33.3% chance. If it does not work, not much is lost, so the risk is very low, but the reward is potentially high. Also important to consider is that Kevin is essentially telling everyone that he does not have the ace.

Moe follows Kevin’s lead with a queen of hearts, a play that the other players critique during the focus group interview. Jonah asks this question of Moe’s play: “He had three hearts, why would he play the queen?” What Jonah was suggesting was that since Moe has a partner in last position, playing a medium high heart is a waste. Moe must know that if neither Kevin nor he has the ace, then one of the next players must have it. Either way, he will not take the book with his queen, so playing a low card here (playing off) saves his queen for later.

But playing the queen sets in motion an interesting play by Abe: the king of hearts. He obviously knows that Sid in last position has the ace, but he plays the king knowing that it will get taken. Why sacrifice his king here when he could play a low heart and perhaps take a book later after the ace has been cleared? Here’s how Abe and Sid explained this strategy:

Al: Now what would you [Abe] play here?
Abe: I gotta play the king, so the queen won’t walk [i.e., take the book].
Al: Right now you [Sid] would play the ace. Exactly. That’s what happened in the game. Now my question is why would you [Abe]
play the king of hearts there, ‘cause you know it’s not gonna take it cause…

Abe: Yea, cause if the queen walks, that’s an extra book that they woulda had with the ace.

Sid: Yea, I’m just gonna play up under him.

Abe: If I wouldn’t have played the king, his queen would have walked, and he [Sid] would have played a low heart instead of the ace.

Al: Oh.

Sid: He’d still got that in his hand. If he hadn’t have played that [the kh], then I could have played this [a low heart].

Abe: Then the queen would have walked, and then the ace would have walked.

So Abe’s play was defensive: it kept the other team from taking two books: one with the queen and one with the ace. His opponents were attempting to maximize their winnings given their cards, while Abe played the king to minimize his team’s losses. To do so, he considered a number of pieces of evidence that he either knew or inferred: the cards played by the two previous players, the cards he is holding in the suit led, and what cards the player in last position is likely holding given what cards have been played. Given this evidence and the inference made, Abe predicts possible outcomes given his choices (kh, jh, 8h, 6h). If he plays a card lower than the queen, the last player will play off (i.e., play a low card), then Moe will take the book with the queen. Moe will then likely lead a heart, knowing that his partner has the ace.
Since it is early in the game, and hearts have only been played once, the probability is still high that the ace will walk. However, if Abe sacrifices his king, Sid will have to play his ace, and the opposing team will take only one book. So by considering evidence, by drawing inferences about what cards players are holding based upon what cards have been played by whom, and by predicting various outcomes given one’s choices, the players construct strategies that either maximize gains or minimize losses. Such strategic thinking goes beyond a focus on the current book being played, considering it within the context of previous books played and what books might play out in the future given particular choices.

The sixth book reveals how the players infer what cards players are holding by what they play. Abe leads the book with the 8h, and his partner Kevin takes it with the 3s, a trump card. Abe had a number of cards to choose from, so I asked him why he played the 8h. Kevin responded by saying, “Cause he knew I was cutting.” Then Abe said, “Cause he played off last time when the jack walked.” If we look at the fourth book, Abe played a jh. He knew that the ah, kh, and qh were all played in the first book clearing the way for the jack to take a book, a somewhat rare occurrence in New School Spades. Then Sid played the 5h, and then Kevin, Abe’s partner, played off with a 7c. Kevin did not trump here because his partner Abe had already won the book. Trumping now would be going over his partner, not maximizing the use of their cards. Also, by playing the 7c, Kevin essentially told Abe that he was ready to trump hearts. So they took the book with Abe’s jh, and two plays later, when Abe had the lead and had a number of cards from which to choose,
he strategically played the 8h knowing that Kevin would be cutting hearts. By playing as a team then, they maximized the use of their relatively low cards (jh, 7s) and took two books.

Another example of this form of advanced play comes from another critique of one of Moe’s plays. During the ninth book, Kevin led with an 8c and Moe followed with a js. Here’s what the players said about that play:

Al: [To Jonah.] Now what were you gonna play?
Jonah: I would have played off ‘cause I know that Sid couldn’t.
Al: Tell me that again. Explain that out.
Jonah: I would have played off ‘cause I knew that my partner is cuttin’…
Abe: Cause he played off with the king of clubs.
Jonah: …and he would have won the book anyhow cause he’s cuttin’.
Sid: Moe don’t know what he be doing so…
Abe: Remember the last book he [Sid] played off with the king of clubs?
Al: Right.
Abe: So that means that he don’t got no more. So Jonah wouldn’t cut. He’d just play off so his man could take the book.
Al: Cause he’s got position.
Abe: Yea.
Al: And he can throw a low spade on there and take it.
Abe: Yea.

Again, the players can infer from previous plays what their teammate is holding and what he will likely play. They use this information to maximize the combined strength of their cards. To make an expert level play, Moe should have known that Sid was cutting clubs, then saved his js for later and played off with one of his diamonds. This would have allowed Sid to take the book with the lowest spade possible and Moe to save his js for another book.

*Player resources.* The above analysis indicates that to be an expert in Spades requires that the players learn and develop a number of resources. The players learn to read their hands, not only to assess their strengths and weaknesses, but also to draw inferences about the other players’ hands as well. For instance, if a player is holding a high number of cards of any given suit, then the probability is high that someone will be cutting that suit. They subsequently read the cards other players are playing to see who will be cutting. If a player throws off a high card in that suit, then that player may be the first one cutting. If that player happens to be your partner, then you know to lead that suit so that he will play trump.

The players also learn to communicate using the cards. Such communication involves ‘reading’ cards: not only making an observation about a card being played, but also inferring what it means about the cards the player is holding. Kevin describes this form of communication as “Some kinda subliminal shit going on” involving no language, only cards played in context. Of course, the players consider cross boarding, or the direct communication between teammates, as cheating, and
Unlike reneging, it is greatly frowned upon at these tables. As a result, the expert players have developed ways of knowing what their teammates are holding based upon the cards they play. However, as part of the continual arms race going on at these tables, players like Sid play cards designed to send inaccurate messages to confuse their opponents. As all of the expert players have developed the ability to read the cards, some begin to jam that communication by playing cards to make opponents draw incorrect inferences which could prevent them from capitalizing upon one’s weaknesses.

Going hand in hand with this form of communication, the players have developed a selective memory of cards played. It would be virtually impossible for a player to remember every card played. Consequently, they have learned to read cards played at particular times. Remember above when Abe inferred what Kevin meant when he played off with the 7c: “I am ready to cut hearts, so if you get the lead, throw me a heart!” Abe remembered this card two books later when he led with his 8h.

To these players then, a game of Spades is akin to solving a mystery. At the beginning of the hand, they see only their hands, a part of the bigger picture. Every card played subsequently provides a piece of evidence about what cards are being held by which players. By making observations and memorizing which players have played which cards, and by inferring what that piece of evidence tells them about the cards the other players are either holding or not holding, they begin to form a picture of the puzzle, one more complete than shown by the cards played. They use this
picture to make plays to maximize the number of books taken while minimizing the number of books lost.

As seen above by the difference between the players in the interview and Moe, using observations and inferences to base future decisions separates the experts from the novices. The expert strategies and resources highlighted above are designed around an ethic of conservation: taking books with the least amount of expenditure of the value of one’s cards. The expert players are essentially conducting a cost-benefit analysis by expending the least amount of cost for the maximum benefit to the team. Any player can take a certain number of books with a hand full of aces and jokers; however, such hands are rare. The expert players at Biddie Mason have developed resources that help them win books even with modest hands.

The analogy to science is striking. Scientists try to solve mysteries about nature. They do so by collecting and connecting pieces of evidence gathered through a host of practices (i.e., research, modeling, and experimentation) to form a more complete picture or model of a phenomenon. Like the Spades players, scientists always operate from an incomplete picture of reality. Successful scientists are those who combine their understanding of empirical evidence and use their imagination and creativity to see past the evidence at hand and use it to make inferences about an imagined reality. They then make choices about further investigations that will lead to further evidence to form a more complete picture.

The above analysis shows that Spades players do something very similar in their world of Spades, and therefore, come well-equipped to science classrooms to
solve such mysteries. Everyday at lunchtime, the Spades players are dealt hands that contain only pieces of a larger picture. Through playing the game, they have developed a number of abilities to help them see past their hands. As a result, they come equipped to our classrooms with the ability to make and memorize observations, draw inferences based upon their observations, use probabilistic reasoning in context, and make decisions that maximize gains and minimize losses using the least amount of resources.

Further, the cognitive resources that these players learn and develop are intimately tied to Spades: a cultural practice that, along with Bid Whist, dates back nearly 150 years. It would be short sighted then to view the cognition in practice that we saw in the above analysis as traits of the individual players. Borrowing from Gutiérrez and Rogoff (2003), it is helpful to view such resources as repertoires of practice: the shared and dynamic forms of practice, and their associated forms of cognition, that have evolved over time in cultural practice. Along with this analysis, the fact that Bid Whist and Spades are quite common suggests that the kinds of resources relating to science exhibited by the players at Biddie Mason are widespread throughout African American communities in the United States and date back 150 years. Interestingly, these resources of the Spades players may actually be somewhat simplistic compared to those of expert Bid Whist players, as that game is much more complicated than Spades. Further, Bid Whist and Spades are not games played only by the intellectual elite. During the games’ inceptions, southern farmers played Bid Whist and working class African Americans played Spades in urban centers in the
North. As a result, the kinds of cognition identified above have arisen from working
class cultural practices and are likely common across both gender and class in African
American culture.

*Findings of the Syncretic Analysis*

As a valued cultural-historical practice then, Spades is a game through which
these young men learn, develop, display, and perfect a host of cultural resources and
competencies. The Spades players have either changed or adopted changes to the
game that exploit their resources. Interestingly, the ability to use creativity and
innovation to change practices in ways that exploit one’s strengths, gain an edge over
the competition, and make a game more enjoyable appears to be one of those
competencies. The tradition of changing card playing practices began with “putting
the bid in Bid Whist” (Morrison & Lamb, 2005) during the Civil War Era, and
continues today through the game of Spades in the common areas and cafeterias of
Biddie Mason High. Using the Old School Spades of their adult caregivers as a
foundation, New School players have all but abandoned the relatively conservative
traditional game of Spades complete with bag limits and spades-only trump cards. In
its place, they engage in less constrained, but arguably a more complicated game, that
plays into their strengths: the ability to strategically and simultaneously talk, count
cards, selectively memorize cards played by teammates and opponents, assess risk,
bluff, read partners as well as opponents, renege, switch books, and estimate
probabilities. Their resources come together in what I call an ethic of conservation:
the ability to consistently win books with the card of the lowest possible value.
Importantly, their resources are displayed and performed not only at high levels of spades play, but are done so almost effortlessly by the expert players. The result is a fast-paced, fun-filled, strategic, competitive, and cooperative game that is obviously appealing to many African American youth. In part then, these young men play Spades because it is a context in which their resources and competencies are valued and employed necessarily for success in the game.

By invoking Sewell’s (1992) theories of social structure, the syncretic analysis presented above helps us to gain further insights into the inner workings of the New School Spades community. According to Sewell, structures are comprised of cultural schemas and resources. Sewell (1992) defines cultural schemas as “conventions, recipes, scenarios, principles of action, and habits of speech and gesture built up with…fundamental tools” and “rules of etiquette, or aesthetic norms, or recipes for group action…” (Sewell, 1992, pp. 7-8). A significant cultural schema from which expert New School Spades players operate is the ethic of conservation: always take a book with the card of the least possible value. The players have learned and developed a number of resources in order to consistently enact this schema: card counting involving the selective memorization of cards played by whom, making observations of their own cards and cards played and inferring from this information the cards that other players are holding, and making predictions about future outcomes. These resources, enacted in the service of the ethic of conservation, are the means through which the players maintain and enhance power and are thus recognized, valued, and legitimatized in the community. The players access and use
their resources to maintain their positions at the expert tables. Further, as Sewell theorizes, such resources are unevenly distributed giving some players an edge over others. As we saw from the above analysis, some players understand the ethic of conservation and marshal their resources accordingly, whereas others do not. As a result, some players win games more consistently than others creating a hierarchy within the Spades playing community. Player resources are therefore the “embodiment” of the ethic of conservation. The ethic of conservation and its resources “mutually imply and sustain each other over time” (Sewell, 1992, p. 13) thus giving rise to, along with other schemas and resources, what Giddens (1981) would call a social structure.

However, as the diachronic analysis has shown, the social structure of New School Spades is far from static. Once particular players consistently apply the ethic of conservation and its necessary resources in practice, they can occupy positions in the community from which to commit acts of power. When other players begin to catch on to this ethic and apply the necessary resources, the expert players change the rules or develop new tactics, strategies, and resources. Such acts solidify, for a period of time at least, their positions at the expert tables.

Consequently, another cultural schema invoked and valued by the Spades community is a belief in the plasticity of practice: dominant community members can change practices to suit their needs, wants, or whims. As the above analysis has shown, the players make rule changes that make the game more fun and challenging. Their acts of power and agency preserve the game as well as the community that has
evolved at Biddie Mason. In doing so, the players have created a porous practice, one that rather than excluding their resources, invites them in to develop and flourish. In other words, New School Spades is open to the transposition of schemas and resources (Sewell, 1992). Without this feature, one which makes for a dynamic practice, New School Spades would likely cease at Biddie Mason, as the players would lose interest. By operating then as powerful agents of change in this community, they have both created and sustained a rich context for their own learning and development to take place.

**Contextual Features of New School Spades**

Drawing from and building upon the syncretic analysis as well as Sewell’s theories of social structure, I present below the features of New School Spades that make it such a rich context for learning a development. Based upon the historically poor achievement of this demographic group, especially in science and mathematics, placing the player models presented in Chapter Five within a context is needed and could help educators design environments to promote learning for African American young men. The features suggested by the syncretic analysis are as follows:

1. *A valued cultural-historical practice forms the focus of activity.* The diachronic analysis showed that New School Spades is a recent version of a cultural practice that dates back to the Civil War Era for African Americans. Therefore, for a century and a half, generations of African Americans have engaged in this practice and have passed it down to their children. With such strong ties to the past, as well as to a larger African American experience and history, it is no surprise that both Bid
Whist and Spades are highly valued practices through which adults and children alike learn and develop a host of resources.

2. A community of practice with a hierarchy of members. Since 2004, a community of practice has developed around New School Spades in the cafeteria and common areas of Biddie Mason High School. Pecking orders around expertise are established and constantly change, exemplified by Abe’s fall from the expert table during the 2006-2007 school year. Newcomers arrive as freshmen having either learned the game from their caregivers or learn it from their peers at school during lunch. As exemplified by Jonah’s rise to the expert table in just one year, newcomers can establish themselves as experts by winning games and attracting equally savvy partners.

3. An enjoyable social activity that requires a group. Spades requires a group to play. Although some of the players learned two-handed Spades from their caregivers, New School Spades always takes place in groups of four. What binds these groups together is not only the structure of the game and their levels of status in the community based upon their expertise, but also by how it is played by these young men. The slamming of the cards on the table, the dialogue, and the “shit talking” make the game highly social, enjoyable and exciting.

4. Intellectually challenging activity. As seen by the analysis thus far, and is taken several steps forward in the next chapter, New School Spades is intellectually challenging. The expert players have developed the ability to attend to multiple variables and factors simultaneously in order to consistently play the right card at the
right time. One only has to sit in on a game as a player to experience just how challenging New School Spades really is. Being a novice at the game, I was consistently humbled every time that I was invited to play. Interestingly, the expert players invited me only once to play at their table. During this occasion, I consistently made “bad” plays that defied the players’ ethic of conservation. The several other times I played were at side tables with less experienced players where I was still no match for their prowess.

5. Competition-cooperation dialectic. As evidenced by the importance that the players place upon winning, Spades is a highly competitive game. However, as was demonstrated by the synchronic analysis, only players who cooperate with their partners by engaging in subtle means of communication, usually through the cards played, can win at these tables. As a result, inherent in New School Spades, as well as in many other games, a dynamic tension exists between two apparently opposite features: competition and cooperation. Cooperation adds a level of complexity that purely competitive games lack, as players must consider plays by their partner as well as plays by their opponent.

6. Dynamism. Spades is an ever-changing game. As shown by the diachronic analysis, such change has taken place across both time and space over the past 150 years, and is taking place in this localized community of practice at Biddie Mason. In this local community, Spades is like a constantly moving target, an arms race that only the best players who make the changes, and are attentive as their opponents catch on, can be successful at winning. Not only has the game changed over time, but
also the synchronic analysis demonstrates that Spades is an inherently dynamic game, as no two occurrences of it are the same, giving the practice the feature of perpetual novelty. Such novelty can keep the interest of players for many years.

7. Empowering. New School Spades at Biddie Mason is empowering for the players. The practice is porous to their intellectual, cultural and social resources inviting them in and allowing them to develop and flourish. Further, the expert players can establish themselves as the rule makers in the community placing them in positions from which to commit acts of power: creating new rules, changing the game to align with their strengths and deciding who gets to play at what tables. Further, by continuously winning, the players can actually say that they are the best at something, a truly rare occurrence for many youth.

8. An equalization of risk. As we saw from the above analysis, Spades players must continuously deal with uncertainty and risk. Assessing risk through the use of player resources like probabilistic reasoning, counting and memorizing cards, and predicting future outcomes is a central feature of Spades. The players hold that going blind and playing the little joker are two of the biggest risks in Spades. Such moments add excitement to the game and provide players with a stream of opportunities to display their prowess at the game. Importantly, risk is equalized in this context in that all players must play from different in positions. For instance, a player who wins a book from fourth position, a position of low risk, must lead the next book, a position often incumbent with a much higher degree of risk.
As highlighted previously in the synchronic analysis, the players learn resources through New School Spades that are connected in nontrivial ways to the disciplines of science and mathematics. In the next chapter, I highlight the models and forms of model-based reasoning that the players have learned and developed through Spades. The syncretic analysis presented above helps us to place these models in this historical, social, cultural and political context, giving them meaning and significance, connecting them to the repertoires of practice that have been historically developed in African American culture, and providing us with clues in how such contexts may enhance learning in classrooms.
Chapter 5: Player Models and Model Based Reasoning in Spades

Overview of the Chapter

In this chapter, I analyze the reasoning that guides players’ decisions when bidding and when choosing a card to play. The synchronic analysis laid the groundwork for the analysis, as it was found that the players make observations and gather evidence based upon what they know: the cards in their hands, the cards played by other players, the structure of the deck, and player proclivities. Using this information they draw inferences about what they do not know: the cards that other players are holding. Further, they use their inferences to predict future outcomes and base the cards they choose upon their predictions. Making observations, drawing inferences, and making predictions about the unknown are integral aspects of model-based reasoning (Windschitl & Thompson, 2006).

To build upon the synchronic analysis and findings, I analyze more deeply the kinds of reasoning, the multiple variables or factors considered, and the kinds of mathematical relationships that players understand and use when they make bids when deciding what cards to play. I base my analysis on a number of sources of data, mainly my repeated observations and analysis of 676 plays across 13 called games, numerous brief interviews with players during games, one think-aloud session when the players explained their reasoning behind their bids, and another when they did the same about the cards played. As a result, I have constructed a number of representational models that make explicit player reasoning. The models include one
for bidding, two for leading (i.e., common and uncommon leads), and one for the second, third and fourth positions of play.

*Bidding in New School Spades*

I begin the analysis of player models and model-based reasoning with bidding for three reasons. First, bidding is the first phase of play in the game of Spades. Second, as the diachronic analysis in Chapter Four showed, African Americans added bidding to American Whist making it a central part of their card playing practices. Consequently, the reasoning that the players demonstrate during bidding has likely evolved as part of the repertoires of practice of their Bid Whist and Spades playing predecessors. Third, bidding creates the goals for a hand for each team. Player goals are simple and two-fold: to be successful in making one’s bid while preventing the other team from making theirs. As a result, expertise at bidding can be the difference between winning and losing a hand.

Before focusing upon the model that represents what players consider when they make bids, it is helpful to place bidding within a New School Spades context. First, thirteen books can be taken during each hand in both Traditional and New School Spades. However, in Traditional Spades, the players bid each hand, whereas in New School Spades, “the first hand bids itself”: no bids are entered, the thirteen tricks (or books) are played, and the teams simply score their hands accordingly (i.e., ten times the number of books taken). In Traditional Spades, the bidding begins with the player to the left of the dealer, and continues in order around the table. Teammates add their bids to arrive at the total bid for their team. In New School
Spades, the non-dealing team bids first, and then the dealing team bids. What often occurs at this stage is more like a conversation about bidding. The teammates of the non-dealing team ask each other questions like, “How many books you got?” They then arrive at their bid. The dealing team then goes through the same process. In new school, the minimum bid is four for each team, and eleven for both teams. If the total bids do not add up to eleven, the teams throw in their hands and the deal passes to the next player. If the total bids of the teams exceeds 13, the players call it a “whup’ ass hand”, as it is inevitable that one team will not make their bid and get set.

Often times, the teams adjust their bids in reaction to the opposing team’s bid. Importantly, teams use this opportunity to invoke strategies, as shown in the transcript below. The following interview took place after a round of bidding.

Al: Alright. Okay, so you guys started off with six and then these guys went board, and then you went to seven, and then you went to five.

Jonah: It’s like a strategy. If the, if the bids only add up to 10, it has to be higher than ten, it has to be at least 11.

Al: Right.

Jonah: So, they would have had to throw their hand in, and they thought they had seven, so they moved up, and we moved up cause we knew we had five. We might end up stickin’ them. It’s like a little strategy: underbid and make them move up to seven.
In this case, Jonah invokes the underbid strategy so that the bids purposely do not add up to the required 11, hoping that the other team will raise their bid increasing the likelihood that Jonah’s team can set them. In New School Spades then, the rule changes (minimum bids of four and eleven) and the conversational style of bidding make for a more dynamic bidding process than in Traditional Spades, providing additional opportunities for players to invoke strategies.

**Bidding Models.** During the bidding process, the players take into account a number of variables and use mathematical reasoning when deciding upon their bids (See Figure 5.1). The model presents the variables considered, the reasoning that players use when considering that variable, and the mathematical relationships suggested by such reasoning. The mathematical relationships between variables are direct and inverse relationships\(^{12}\).

Variables considered by the players include card strength, the number of cards held in any particular suit, player bidding tendencies, player levels of expertise, the current score of the game, and the level of confidence in one’s partner. First and foremost, the bid depends upon the cards in one’s hand. The players tend to separate cards considered for bidding into two categories: “definites” or cards that have virtually a 100 percent chance of taking a trick, and “possibles” or cards that may or may not take tricks depending upon a number of factors. Cards considered definites

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\(^{12}\) A direct relationship occurs when one variable increase or decreases, and the other variable does the same. With an inverse relationship, when one variable increases or decreases, the other variable does the opposite.
are high-ranking Spades (e.g., big joker, little joker, deuce of hearts) and high ranking cards of other suits, especially aces and kings. However, high-ranking non-spades can be either definites or possibles based upon the other cards in a player’s hand of that given suit. Abe described his decision-making process like this: “It depends upon how many in a suit that you have. If you have too many in a suit, you’re gonna get cut. Even aces might not work in this situation. You can’t take many books in that suit. Four is a good number. Past four, someone is missing the suit, and they’ll cut you with a spade.” In other words, the probability of a “possible” taking a book decreases as the number of cards held in that suit increases. The last column of Figure 5.1 shows the mathematical relationships suggested when players consider particular variables. Although the players do not speak in such mathematical terms, their talk and actions, as exemplified by Abe’s quote above, indicate that they reason qualitatively in ways that are commensurate with probability and direct and inverse relationships between variables.

Lower ranking spades are also considered possibles and their strength is conditional based upon two factors: the number of cards held in a suit and the number of low spades held. A player holding only one card in a particular non-spade suit would most definitely bid a low spade, as he would know that he would run out of that suit quickly and most likely be the first player to trump clubs. Further, a player holding four low spades may bid one trick for these four trump cards reasoning that at least one would take a trick.
Figure 5.1. Model of player reasoning used during bidding in New School Spades.
In addition to the cards held, players consider other factors as well. Players stated that bidding also depends upon the bid of the other team. If the opposing team bids high, players tend to bid fewer possibles to prevent from getting set. On the other hand, if the opposing team bids low, players tend to bid more of their possibles. The conversational style of bidding allows for such adjustments and negotiations to take place with all players, rather than only with the last bidders in a round, as happens during the ordered bidding in Traditional Spades. The young men also stated that players have certain “tendencies” that need to be taken into consideration, as we saw in Chapter Four with Abe’s underbid strategy. Another bidding tendency is the level of risk a player or team is typically willing to take on. If a team having a reputation for bluffing enters a low bid, a player may bid fewer of their possibles; whereas, playing against a team of conservative bidders may result in bidding more possibles. Players also need to consider their own partner’s tendencies. Knowing the proclivities of all players at the table then enters into the decision-making process of bidding. In addition to considering player dispositions, players stated that they consider the expertise of their partner and how well they play together as a team. High levels of confidence in one’s partner established through extended play and high winning percentages leads to bidding more possibles and taking on greater amounts of risk.

The players also consider the score of the game when making their bids. When teams are behind by a large margin, the players tend to assume more risk. For
example, teams can go single blind if behind by at least 100 points, and double blind if behind by at least 200 points. In these cases the players bid seven books without looking at their cards. If they make their bids, they receive 140 points for a single, and 240 points for a double blind. Players hold that going single and double blind are among the largest risks taken in Spades.

    Al:    Okay, so talk about risk in Spades. What are the risks involved in this game?

    Trace:  You put your cheeks on the table.

    Jonah:  You don’t know what the person behind you has.

    iPod:   The blind. That’s the biggest risk.

    Jonah:  Yea. The blind, too.

    Sid:    That’s the biggest risk.

    Table 5.1 shows a score sheet from a game in which Jason and Munch used each strategy twice in order to turn a complete blow out into a very close game in which Kevin and Jonah, despite their huge leads throughout the game, eventually won by only two books (20 points). The players know how to assess risks when bidding, are not afraid to take them, and their risks often pay off.

    Finally, players often consider how hands may play out when bidding their cards. Here are two examples of Munch and Ice talking about their decisions during a focus group interview.
Table 5.1. Score sheet showing use of single and double blind strategy.

<table>
<thead>
<tr>
<th>Jason/Munch</th>
<th>Kevin/Jonah</th>
<th>Hand Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>60</td>
<td>1st</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>2nd</td>
</tr>
<tr>
<td>130</td>
<td>120</td>
<td>3rd</td>
</tr>
<tr>
<td>40</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>420</td>
<td>4th</td>
</tr>
<tr>
<td>*140</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>470</td>
<td>5th</td>
</tr>
<tr>
<td>-70</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>530</td>
<td>6th</td>
</tr>
<tr>
<td>**240</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>580</td>
<td></td>
</tr>
<tr>
<td>*140</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>540</td>
<td>530</td>
<td>7th</td>
</tr>
<tr>
<td>-40</td>
<td>180</td>
<td>8th</td>
</tr>
<tr>
<td>500</td>
<td>710</td>
<td>9th</td>
</tr>
<tr>
<td>**240</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>740</td>
<td>760</td>
<td>10th*</td>
</tr>
<tr>
<td>60</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>830</td>
<td></td>
</tr>
</tbody>
</table>

*Single blind.
**Double blind

Al: Okay. Alright. Now, one by one, go ahead Mike pick up your hand. What I want to know is how much you bid and why you bid those cards.

Munch: I said two and two possibles. I got one.

Al: Okay. One little joker.

Munch: Two of diamond.

Al: Two of diamond.
Munch: King of heart and the king of diamond are my two possibles.

Al: Two possibles. Okay so why are those…two possibles?

Doug: Cause that king of hearts is all mine!

[Laughter]

Munch: That’s alright. Cause if I play the queen of diamond,

somebody gonna have to play that ace. So that will leave me

with the king of diamond.

Al: So that’s possible.

Munch: And, if I play the queen of heart, then someone gonna have to

play the ace of heart, leaving me with the king of hearts.

Munch therefore envisions using his queen to clear the way for his king to take a

book, as the ace is the only card besides trump that can beat the queen, since he is

holding the king.

In another example of how players play out scenarios when making bids, Ice
describes what the players call a set up. Here is how Ice described his strategy:

Al: Okay [Ice]. Whadya got?

Ice: I had the joker, ace of diamonds, and these right here I said are

my two possibles after those. Two books, two possibles.

Al: You gotta book with the ace of diamond and a, why the book

with the ace of diamond cause you have only four diamonds

here?
Ice: Yea, because most likely, even though I got four diamonds, like this here would probably have been the first book. All they needed is for one person to have a diamond, What’s the chance that, that, let’s say that, like if he has one diamond, and he has one diamond, even if my partner doesn’t have a diamond, he doesn’t need to have a diamond, cause he’ll just throw off.

Al: Ah, that’s really good. That’s something that I hadn’t learned before. That’s cool. And these are two possibles why?

Ice: Because, I woulda just, probably after this book, what I woulda did, like after this, I woulda seen that he was cuttin’, so I woulda set him up. So after I pulled this king out [king of spades], he’d probably shell out his deuce of diamonds, then I would have set him up so that he [Ice’s partner] would have took him out.

Munch: Come on math whiz.

Ice: See what I mean?

Al: Na. I don’t see that.

Ice: Okay. Let’s say [Doug] plays a club. Play a club [Doug]. Then I’ll play the king. Then what he would do if he run out of clubs, then he’ll play like this [two of diamonds]. Then he’ll
bring it to him, and then after that, then he’ll hit’em with the
two of hearts, then he’ll lose a book, and we get a book.

A set up is therefore playing a card designed to make an opponent play a card
that one’s teammate can then likely beat. Both players in the above transcripts,
Munch and Ice, are dealing with high amounts of uncertainty. In both cases,
they play out likely or possible scenarios when considering their bids,
especially with their possibles, and then bid their possibles accordingly.

When deciding upon their bids then, the players communicate with
their partners, consider a number of variables, and qualitatively understand the
direct and indirect relationships between these variables. They also play out
likely scenarios when bidding their “possibles”. In this stage of the game, as
seen above, the players are dealing with a high degree of uncertainty. Much
like was found in the synchronic analysis, they use what they know (i.e., their
cards, their partner’s bid, and their opponent’s bids if bidding last), to draw
inferences and make predictions about what may occur during the hand.
Importantly, they also consider probability as a variable, something that
changes as other variables change. All probabilities in Spades are therefore
conditional in that they depend upon other occurrences or variables. The
players understand that the probabilities not only change, but also do so in
predictable ways as they are either directly or indirectly related to other
variables. For instance, the players understand that as the number of cards
held in a particular suit increases, the probability of taking a book with any of
their high cards in that suit decreases. The players’ understandings of probability are therefore highly situated within particular occurrences and always in relation to other variables at work in the game.

*Leading in New School Spades*

*Common Leads.* Positioning is an important aspect of the game of Spades. During most every hand, the players play from four positions: lead or first position, then second, third, and fourth positions. What distinguishes the four positions is increasing levels of certainty when going from first to fourth positions. Leaders often, but not always, play from a position of uncertainty, as they often do not know what cards the next players will play. As a result, leading is analyzed separately, as it is a position from which players closely consider the cards that they play. When playing from the other positions, players often simply follow suit, or in the case of fourth position, simply play the card that will take the book, or allow their partner to do so. Leaders do not have this luxury. As a result, leaders consider a number of variables highlighted in Figure 5.2, which shows the common leads that I categorized by analyzing all leading occurrences in every game recorded from the data set. Consequently, the model is based upon repeated observations of similar plays.

When deciding what card to lead, the players take several factors into account. One thing leaders always consider is the position from which they are playing at any given time during a hand. Playing from first position can be powerful in that the leader determines what suit is led and the initial course of the hand. For instance, if
QuickTime™ and a TIFF (PackBits) decompressor are needed to see this picture.
the leader is holding a number of high cards, they can essentially determine, with high probability, the outcome of the first books in the game by leading their high cards in succession. Such play increases the chances that any high card held by the leader will take a book, as early in a hand the probability of getting trumped is low. The likelihood is even lower if the leader is holding a small amount of cards in that suit, as this increases the chances that all others will have at least one card in that suit. In these situations, the other players simply follow suit. Leaders also play cards that accentuate the strengths of their own and their partner’s hand. Leaders often play a suit of which they have only a low number of cards, increasing their chances of being the first player to play trump (or cut) when that suit is lead. Likewise, if a leader knows that their partner is trumping clubs, they will play a club. This play is especially effective if the leader has a low number of cards in the suit his partner is cutting, as the probability is then high that both opponents are holding that suit and cannot challenge with a spade.

Weakening the first position is the fact that both opponents play cards after the leader and the opposing team has last position. As a result, the level of uncertainty can be high for the leader, whereas the player in last position, having the benefit of seeing all the cards on the table, plays from a position of certainty. As a result, leading is a position of power but also a position incumbent with high levels of uncertainty.

Consequently, leaders play both aggressively and conservatively. When players are either confident or certain that they have the high card, as in the early ace
lead, or when they possess the high spade remaining, they tend to play aggressively. They do so when the likelihood is high, and in some cases 100%, that they can win the book without help from their partner. For instance, players typically lead aces and high suit cards early, as the likelihood is highest of taking a book when the suit is being played for the first or second time. After a suit is led for the first time, the probability drops considerably that both opponents are holding that suit and cannot trump (without reneging, of course). Towards the end of a hand after trump has been played, and leaders know they have the high spade remaining, they often lead it not only to take the book, but also to catch opponents’ spades in the process. In short, leaders play aggressively when the chance is low that their opponents can challenge them, as they need to follow suit (or renege).

Leaders often play conservatively when they are either uncertain whether they can take a book or positive that they cannot. In such situations, they typically play off (play a low card), but often do so strategically, as we saw in the synchronic analysis in Chapter Four when Abe played an 8h when he knew Kevin was cutting that suit. When deciding upon what low card to play then, the players try to “feed their partner” a card or suit that he can work with. As we saw with Abe’s play above, leaders attend to what suits have been cut by whom, then play cards that their partner is cutting and refrain from playing suits that their opponents are cutting. So when leaders throw off, they do so in ways that play into what they think are their partner’s strengths and their opponent’s weaknesses. They assess these strengths and weaknesses by recalling which cards have been played by whom.
The above analysis of 169 leads demonstrates that when leading a card, players consider the level of certainty that they can either take or not take a book. They also consider a number of variables when considering what cards to play. Importantly, even when they cannot take a book, expert leaders often lead cards that play into what they think are the strengths of their partner’s hand or the weaknesses of their opponents’ hands. They assess such strengths and weaknesses by attending to the cards played by the other players.

*Uncommon leads.* Leads only observed on a single or few occasions are shown in Figure 5.3 and highlight some interesting strategies. As seen previously, leaders consider what cards they are holding and what cards have been played when deciding what to lead. They do so in order to try to protect their higher cards, the foundation of their bid, from getting beaten. In some situations late in the game, players will lead a non-spade rather than a spade. For instance, towards the end of a hand, Kevin was holding the 6h, Ks, and the little joker. Rather than lead the Ks, a strategy often used to draw out the big joker, Kevin chose to lead his 6h. Having another spade along with his little joker gave Kevin a choice if his opponents led spades in the final two books. Had he led his Ks, he not only would have gotten beat by his opponents, he would have lost this option in subsequent books had his opponents led a spade. He would have been forced to play his little joker and could have possibly gotten trapped into losing it to the big joker, one of the more humiliating occurrences for an experienced Spades player. As a result, players sometimes lead particular cards to protect other cards in their hand.
Figure 5.3. Model of leads observed either once or infrequently.
Although risk is involved in any lead when a player is operating from a place of uncertainty, how players assess risk was most apparent in two of the three uncommon leads. Technically, risk assessment involves two separate calculations: the likelihood that a loss will occur and the magnitude of that loss. In Spades, the first calculation is a straight probability based upon the cards in one’s hand and what cards have been played. The second, the magnitude of a loss, concerns the extent of the repercussions in the event of a loss.

Players often take risks that could benefit their team. For instance, during the second book of a hand, Labron played a king before the ace was led. This appears risky, but in the previous book, clubs was led and Labron took the hand from second position with a jack, a relatively low card. When he led the king, he deduced that since neither opponent played the ace, that his partner must be holding it. Based upon this information and the fact that four clubs had already been played, Labron led the king in order to get at least one book with either his king or his partner’s ace. He also knew that his partner would play off, as he would not play over Labron if he had the book won. As Labron would likely take the book and thus lead the next one, such a play leaves an outside chance that Labron could lead the next book with the same suit, and his partner may take an additional book with the ace. The likelihood of a loss was low in Labron’s play, and the magnitude of the loss of not doing so was high, as he and his partner may have not gotten a book from two cards likely included in their bids. When that happens, teams often get set, as they cannot make their bids.
With the likelihood of losing the book being low, and the magnitude of the loss high, Labron took the risk and it paid off.

As shown in Figure 5.3, another infrequent yet interesting lead is playing a medium strength spade (e.g., king, queen, jack). Table 5.2 presents a hand in which Jason led a medium strength spade to begin the seventh book. Jason, who is holding all spades, has three options. He could play a high spade and try to take the book. He has the BJ, so he could play it; however, he knows that his chances of taking one or more of his opponents high ranking spades with the BJ is higher if he waits, as at this early stage in the hand his opponents will likely just play off with low strength spades. As a result, he does not play this card. He could also choose to throw one of his two low spades (i.e., 7s, 9s) and let his partner Munch try to take the book from third position. Regardless, he chooses neither of these options, opting instead to play his jack. Why would he do this? He knows that if the player in second position plays off, then Munch will likely play off, as to not go over his partner, a play that would break the players’ ethic of conservation. Similarly, Jason also knows that if the player in second position challenges his jack, he will likely do so with the lowest card possible, and that Munch will likely do the same, if he has the cards to do so. As can be seen from Table 5.2, this is the scenario that played out. Playing a medium ranked spade then is designed to draw out spades and place your partner in a likely position to take the book, in the event that the player in fourth position does not have the card to do so. The play considers the ethic of conservation at work at these tables: the players will use the lowest card possible to take the book and the result will be a one-
upmanship that will hopefully result in your partner winning the book. The other result is that you have drawn out some of the opposing team’s spades, eliminating the possibility that they can take a subsequent book with one of those cards.

Table 5.2. Partial Spades Game Highlighting Jason's Medium Spade Lead During Book Seven.

<table>
<thead>
<tr>
<th>Player</th>
<th>Book Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kevin</td>
<td>qs 10s 5d 2h 6h ks</td>
</tr>
<tr>
<td>Munch</td>
<td>as 10h 8d 3s 6s 10d 9c</td>
</tr>
<tr>
<td>Jonah</td>
<td>4s 5h 9d 4h 5c kd 6c</td>
</tr>
<tr>
<td>Jason</td>
<td>js 7s 9s 2s 2d BJ 2c</td>
</tr>
</tbody>
</table>

When leading then, players routinely consider the following variables depending upon the situation: the strength of their card(s), position of play, number of cards in each suit in the deck, the number of cards held in a particular suit, cards previously played by one’s teammate and opponents in a particular suit, the number of times a particular suit has been played, the number of spades and other suit cards in your hand, the suits that have been trumped, the suits one is holding, and which players have trumped which suits. The variables players consider change with the situation. Early in the game, leaders typically consider only their own cards, but as the play progresses, they begin to consider in part the variables listed above, most importantly, the cards that their partner and opponents have played, and probabilities.
of future occurrences. As in Jason’s play of the medium spade indicates, the players also mentally play out likely scenarios and make plays accordingly.

*Playing from Second, Third and Fourth Positions*

The model for playing from second, third and fourth positions is shown in Figure 5.4. Playing from second and third positions involves mostly following suit or playing trump. When following suit, players will typically play a low card when they cannot beat the leader or the player in third position. As we saw in the synchronic analysis, players in second position will also play off when they think or know that the player in last position will take the book based upon previous cards played. Likewise, players in third position will seldom play over their partner’s card, as the player in fourth position may not have a card strong enough to beat the card played in first position. However, players in second and third positions also play cards higher than the one(s) previously played. When this happens, the players typically one-up each other, as we saw previously, hoping that they will win the book. As the cards played increase in value, the probability decreases that the next player will have a card stronger card than the ones previously played. As a result, the player in fourth position does not always have a card high enough to take the book, so the players in second and third positions frequently win books with this strategy.

Players in second and third positions also play trump. Again, they play both weak and strong trump cards. The value of the trump card played depends not only upon the trump cards held by a player, but also upon the number of times that a particular suit has been trumped. For instance, in the game shown in Table 5.3, the
Figure 5.4. Plays from second, third and fourth positions.
The order of the trump cards played by the players in second and third positions was as follows: 8s, 9s, qs, js, Lj, as, 2d. The value of the trump cards generally increases as the game ensues. Further, diamonds was trumped twice, first by the 8s, then by the 9s and clubs was trumped three times from these positions in the following order: qs, as, 2d. Generally speaking then, a direct relationship exists between the value of the trump card and the number of times a suit has been trumped. Again, the ethic of conservation is at work here. If a suit is trumped for the first time, trumping with a high spade would be excessive: a three of spades will typically take the book, as the probability is low that the players behind you are also out of that suit and will also play trump.

Table 5.3. Trump Cards Played from Second and Third Positions

<table>
<thead>
<tr>
<th>Book Number</th>
<th>Leader</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Jason</td>
<td>ac</td>
</tr>
<tr>
<td>2</td>
<td>Jason</td>
<td>ah</td>
</tr>
<tr>
<td>3</td>
<td>Jason</td>
<td>kh</td>
</tr>
<tr>
<td>4</td>
<td>Jason</td>
<td>3d</td>
</tr>
<tr>
<td>5</td>
<td>Jonah</td>
<td>ad</td>
</tr>
<tr>
<td>6</td>
<td>Jason</td>
<td>jh</td>
</tr>
<tr>
<td>7</td>
<td>Jonah</td>
<td>4d</td>
</tr>
<tr>
<td>8</td>
<td>Jason</td>
<td>5c</td>
</tr>
<tr>
<td>9</td>
<td>Jonah</td>
<td>9h</td>
</tr>
<tr>
<td>10</td>
<td>Kevin</td>
<td>9c</td>
</tr>
<tr>
<td>11</td>
<td>Munch</td>
<td>7s</td>
</tr>
<tr>
<td>12</td>
<td>Kevin</td>
<td>2c</td>
</tr>
<tr>
<td>13</td>
<td>Kevin</td>
<td>8c</td>
</tr>
</tbody>
</table>

Note. Trump cards shown on bold type.
Playing from the fourth position has the luxury of certainty. As a result, the model for fourth position is quite simple. Players know what has been played, so they have but two options: take the book or play a low card. If their partner does not have the book won, they will take the book, if they can, with the card of the lowest possible value. If their partner has the book won, or if they cannot challenge the other team, they will play off with a low card.

*Player Models in Action.* Analyzing the player models separately does not adequately capture the models in action. Every hand of Spades is dynamic in that each player typically plays from all positions, so the players constantly change their reasoning and the variables to which they attend. To get a better sense of this dynamic context, I focus upon one player through an entire hand.

Table 5.4 shows the results of a complete game and highlights Kevin’s positions during each book. Tables 5.5 and 5.6 show an analysis of Kevin’s plays from each position by referring to the models presented previously and by noting the figure number of the model displayed above, and the numbered plays from the second column in each model. During just one hand, Kevin plays from all four positions, makes eight different types of plays, and draws from three of the models. That is not to mention the renege from book number four, the reasoning for which was covered in the diachronic analysis located in Chapter Four.

Importantly, we must not only consider the kinds of plays that Kevin makes, but also the numerous forms of reasoning and attention to the multiple variables that go along with Kevin’s plays and are contained in the models. For instance, in book
Kevin leads with a kc. He knows that clubs has been played only once, so he plays his kc knowing that the likelihood is high that all players still have at least one club, and that the king will likely take the book. In book seven, Kevin plays from second position. Here he plays a qs, a card just high enough to beat the js led by Jason. His play forces Munch to play his as. Kevin is likely hoping that his partner Jonah will keep this trend of one-upmanship going and take the book, but he does not. However, Kevin has nonetheless forced his opponents to use two spades rather than just one to take the book. In book number four, Kevin plays a 5s, a renege, the reasoning of which is covered in Chapter Four. Mainly, he must consider the likelihood of being caught, which appears to be low, as Munch and Jason failed to catch Kevin and Jonah at a number of reneges during this game. Finally, in book number eight, Kevin plays a 10s from fourth position to take the book. As he is playing from a position of certainty, he plays the lowest card possible that will take the book. The analysis therefore suggests that due to the fact that player position is constantly changing throughout a hand, the expert players use a wide variety of forms

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**Table 5.4. The Multiple Positions From Which Kevin Plays During a Single Game**

<table>
<thead>
<tr>
<th>Player</th>
<th>Book Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kevin</td>
<td>kh</td>
</tr>
<tr>
<td>Munch</td>
<td>ah</td>
</tr>
<tr>
<td>Jonah</td>
<td>7h</td>
</tr>
<tr>
<td>Jason</td>
<td>qh</td>
</tr>
</tbody>
</table>

<p>| Kevin's Position | 2 | 4 | 3 | 3 | 3 | 1 | 1 | 2 | 4 | 1 | 2 | 1 | 2 | 2 |</p>
<table>
<thead>
<tr>
<th>Book Number</th>
<th>Position</th>
<th>Card Played</th>
<th>Model Reference</th>
<th>Player Reasoning</th>
<th>Variables Considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>kh</td>
<td>Figure 5.4, #2</td>
<td>Play this card: 1) if the probability is high that you can win the book or 2) to force player in third position to try and beat your card hoping that your partner in fourth position can win the book.</td>
<td>Strength of cards played, the strength of the cards in your hand. Probability that: 1) the card you play will win the book, 2) or your partner can take the book and 3) your opponent in third position can take the book.</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>jc</td>
<td>Figure 5.4, #6</td>
<td>If your partner has the book won, play off with the lowest card possible.</td>
<td>Cards played previously, strength of cards in your hand either in the suit led or spade if out of the suit, whether of not your partner has won the book.</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4d</td>
<td>Figure 5.4, #1</td>
<td>Play this card if you cannot beat the leader. Saves your stronger cards for subsequent books.</td>
<td>Strength of cards played, the strength of the cards in your hand</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>5s</td>
<td>N/A - Renege</td>
<td>Play this card if you cannot take the book with a card in the suit led and if have a good chance of not getting caught.</td>
<td>Opponents skill level at noticing and catching a renege. If high, the likelihood is high that you will get caught, and vice versa.</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>kc</td>
<td>Figure 5.2, #1</td>
<td>Increases the chances of taking a book, as the probability is high that all players were dealt at least one or two cards in any suit. Probability is higher of taking a book if you have a small number of cards in the suit of your high suit cards, as this increases the probability that your opponents have cards in that suit. Low risk, high reward.</td>
<td>Strength of your card, position of play, number of cards in each suit in the deck, number of cards that you have in that suit, number of times suit has been played, the probability that all players are holding a card in the suit led.</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>jh</td>
<td>Figure 5.2, #1</td>
<td>See above</td>
<td>See above</td>
</tr>
</tbody>
</table>
Table 5.6. The Different Models That Kevin Uses in One Game, Books 7-13.

<table>
<thead>
<tr>
<th>Book Number</th>
<th>Position</th>
<th>Card Played</th>
<th>Model Reference</th>
<th>Player Reasoning</th>
<th>Variables Considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>qs</td>
<td>Figure 5.4, #4</td>
<td>Play this card to beat the player in second or third position. Lowers the probability that the player in third or fourth position will have a card strong enough to take the book.</td>
<td>Strength of spades that have been played previously, the strength of your high spade, the probability that the player(s) behind you has a spade higher than yours.</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>10s</td>
<td>Figure 5.4, #5</td>
<td>If your partner does not have the book won and you can win the book, play the lowest card possible that will win the book.</td>
<td>Cards played previously, strength of cards in your hand either in the suit led or spade if out of the suit, whether of not your partner has won the book.</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>5d</td>
<td>Figure 5.2, #3</td>
<td>As the ace is typically out at this time, there's a 33% chance that your partner has the king. If not, your partner may be out of the suit and can play trump.</td>
<td>Number of times the suit has been played, the probability that your partner has the king, the probability that your partner will throw trump.</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>2h</td>
<td>Figure 5.4, #4</td>
<td>See above</td>
<td>See above</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>6h</td>
<td>Figure 5.3, #2</td>
<td>Protecting your little joker. If you have another spade in your hand along with the little joker, it decreases the chances of getting in a situation when you have to play your little joker if spades is lead, and hence, decreases the chances that your LJ will get taken by the BJ.</td>
<td>Cards in your hand, the likelihood that a player will lead a spade before the big joker has been played.</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>ks</td>
<td>Figure 5.4, #1</td>
<td>See above</td>
<td>See above</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td>LJ</td>
<td>Figure 5.4, #2</td>
<td>See above</td>
<td>See above</td>
</tr>
</tbody>
</table>
of reasoning, as well as consider multiple variables when making decisions as to what cards to play.

*Connecting player models to the research on modeling*

To better connect the Spade’s players’ models to common scientific practices, we now turn to the literature on modeling and model based reasoning. At the heart of modeling is analogous reasoning (Gentner, 2002). Scientists create models that are analogous to natural phenomena, or to what Collins and Gentner (1987, as cited Rea-Ramirez, Clement, & Nunez-Oviedo, 2008) call target systems, and use their models to make predictions about future occurrences within such systems. For example, as was discussed in Chapter One, environmental scientists and public health officials use models to predict levels of harmful bacteria in public swimming areas located along the shorelines of freshwater ecosystems (Monroe County Department of Health, 2006). Models are constructed from what we know, like the components of an ecosystem and how they may change based upon changes in conditions (i.e., when algae concentrations are high, bacteria levels increase). Collins and Gentner (1987) refer to the known aspects of the model as the base, and the unknown as the target. In our example of the public swimming area, the target system is the freshwater ecosystem that gives rise to levels of harmful bacteria in the water. In the process of making predictions, models, especially those concerning complex systems, typically involve reasoning about the mathematical relationships between variables in a system, as in the direct relationship between algae and bacteria levels referred to above.
Placing such models in action then, Rea-Ramirez, Clement, and Nunez-Oviedo (2008) draw from a number of studies to propose that scientists “[‘run’] dynamic models as mental situations, allowing them to predict new findings for cases they have not seen before, almost as if they were running a ‘mental movie’ from the model” (p. 30). Rea-Ramirez et al. (2008) refer to such processes as “imagistic mental situation[s]” (p. 30). Further, in cases in which the system modeled is complex, modelers will parse out the target system and draw from different bases of knowledge to predict outcomes for different target systems (Collins & Gentner, 1987).

Many similarities can be drawn between the above description of modeling and model based reasoning and what the New School Spades players do every day in the cafeteria at Biddie Mason High. As was found throughout the above analysis, a large part of Spades is dealing with the unknown. The players deal with this world of the unknown by operating from what is known: the number of cards in a deck, the number of cards in each suit, the order of the Spades, the cards they are holding, player proclivities, and the cards played by both their opponents and their teammate. In the case of Spades, the unknown consists of what cards your opponent(s) and your teammate are holding and may play during a particular book. To reason about the unknown and to deal with uncertainty, the models presented above show that the players consider multiple variables and the mathematical relationships between them in order to predict what cards will be played. Importantly, as every Spades game is dynamic, the players operate from different models depending upon the situation:
bidding, leading, and second, third and fourth positions. As Spades is complex, the players have in essence parsed out the game by situation, and have created models that help them deal with the unknown at these times.

Further, when calling games, I have often observed players hesitating before playing a card. What is likely happening at these times is that the players are playing out possible scenarios, or conducting “imagistic mental simulations” based upon their reasoning that considers what they know and mathematical relationships to predict the target system. Further, as a result of the perpetual novelty of Spades, the target systems, although constrained by a 52-card deck, can play out in innumerous ways. Consequently, the players are continuously predicting a novel occurrence. In all of these ways then, the players are essentially using model based reasoning much like that of modelers in both science and mathematics, but are doing so in a fast-paced game. Consequently, the players have developed models that help them to make sense of the complexity of a game.

*Contextualizing player models and resources*

Research on mental models from a cognitive perspective tends to place such models inside the minds of individuals (Vosniadou, 2002; Vosniadou & Brewer, 1982). The syncretic analysis presented in Chapter Four places the player models and model based reasoning in a socio-historical context, therefore situating their cognition outside of the individual players’ minds. Likewise, using distributed cognition (Hutchins, 1995) as a framework, Giere (2002) moves away from a focus upon individual mental models by viewing model-based reasoning as cognitive processes
“distributed between a person and an external representation” (p. 229). To do so, Giere (2002) argues that abstract representations (i.e., models) are often not reified in any way. For example, although the models of the Spades players were operating within the community before I arrived and had emerged over time through collective transformations of the game, such models remained conceptual and abstract, not reified in textual or graphical forms. The players involved in the game interacted with their models through their actions during games, as well as through their language both during and after games. Consequently, model-based reasoning in the Spades community at Biddie Mason is distributed between and across the players and the abstract representations they use to make sense of something in the world, the game of New School Spades. From a distributed cognition perspective then, model-based reasoning, especially with groups of people engaged in social activities and cultural practices, need not be located in individual minds, but can be seen as embodied forms of cognition that play out through actions in practice (Clark, 1997; Hutchins, 1995). Further, as model-based reasoning is mediated by language, and language results from the internalization of external representations (Vygotsky, 1962), models and model based reasoning are not only embodied, but also embedded in “society and in a historically developed culture (Giere, 2002, p. 239). From this perspective then, the players’ models could be viewed as embedded in the historically developed cultural practice of Spades in the African American community, as well as in New School Spades in the cafeteria at Biddie Mason High.
Figure 5.5. Diagram summarizing the findings of the syncretic and modeling analyses of Spades highlighting both the features of the context and player resources learned and developed.
Figure 5.5 presents a synthesis of the syncretic and model based analysis of New School Spades, helping us to situate player models and resources not only within the Spades community, but also within the larger culture and history from which the models were derived. The left side of the figure shows, in an abbreviated fashion, the dynamic nature of Spades which is closely tied to African American history, the reasons and purpose for playing Spades, and the contextual features of New School Spades which help to give rise to player models and resources, shown on the right side of the diagram. The player models can be seen then as repertoires of practice distributed throughout the Spades playing community at Biddie Mason and tied to a history of African American engagement in a cultural practice. Finally, Spades is viewed as a rich context in which robust forms of distributed cognition, in the form of models and model based reasoning, have developed.

In the next and final chapter, I summarize the findings from Chapters Four and Five. I then further discuss the analyses. I conclude the chapter by exploring some implications and limitations of the study.
Chapter 6: Discussion and Implications

Summary of Central Findings

The research question guiding this study was as follows: What kinds of models or model-based reasoning are learned and developed by African American young men playing the culturally valued game of Spades? The study focused upon this question to facilitate making connections between what the players learn through the cultural practice of Spades, and what scientists do when they engage in modeling, a practice central to what scientists do. The underlying purpose of the study was to gain insight into how we might improve educational settings for African American young men, as they currently occupy the lowest levels of achievement in science education. In order to contextualize the modeling and model-based reasoning of the players, the study employed a syncretic theoretical framework. The framework afforded a rich analysis of not only the multiple forms of reasoning of the players, but also the features of Spades as a cultural practice that formed the context for their learning and development.

In the exploration of the research question, the study highlighted a number of central findings. Through the diachronic analysis it was found that Bid Whist and Spades are common, culturally valued practices in African American communities which taken together date back 150 years. Players have changed the game of Spades over the past 70 years and the players at Biddie Mason continue that dynamic history by creating and changing New School Spades. They do so in order to keep the game
enjoyable and to maintain a competitive edge over their competitors for the purpose of maintaining status and respect in their peer-based community.

Through the synchronic analysis it was found that expert New School players have developed an ethic of conservation to consistently take books with the card of the lowest value possible. To do so, the expert players use a number of resources, including the ability to talk strategically and simultaneously, count cards, selectively memorize cards played by teammates and opponents, assess risk, bluff, read partners as well as opponents, renege, switch books, estimate probabilities, and predict outcomes. Using such resources allows the expert players to win games consistently, even when they have may not have been dealt the best hands. As a result, they maintain their status as the best players in the Spades playing community at Biddie Mason High.

By combining the diachronic and synchronic analyses (i.e., the syncretic framework), the study highlighted eight features that form a rich and dynamic context for the learning and development of player resources. The features include:

1. A valued cultural-historical practice forms the focus of activity.
2. A community of practice with a hierarchy of members including experts, intermediates and novices.
3. An enjoyable social activity that requires a group.
4. Intellectually challenging activity.
5. Competition-cooperation dialectic.
6. A dynamic activity that changes over time and during each occurrence which maintains the novelty of the activity.

7. An empowering activity where participants use their resources to gain status and respect and occupy positions from which they can change the structure of the activity.

8. Risk of loss or humiliation is evenly distributed across all members in the community.

Finally, through the play-by-play analysis it was found that Spades players use a number of forms of cognition that relate to modeling and model-based reasoning. In short, the players consider multiple variables and factors, as well as their mathematical relationships, to predict future occurrences and then play cards accordingly. Estimating the effects of a change in a variable on the probability of an occurrence is salient, especially in the bidding model (e.g., an inverse relationship between the number of cards held in a suit and the probability of high card in that suit talking a book). As the game of Spades is dynamic, the players operate from different models depending upon the situation. Such models include those for bidding, leading, and playing from second, third and fourth positions.

Significantly, Spades is a practice of great historical and cultural value to the players, their peer-based community, and to a much larger African American community. Through their engagement in this practice, the players have learned and developed considerable resources that have allowed them to master a highly complex activity. Their resources are not only robust, but also flexible in that they allow the
players to master an evolving practice as well as the demands placed upon them by
the multiple positions from which they play during each game.

What follows is a more in depth discussion of the central findings highlighted
above. I begin with an exploration of the model-based reasoning of the players in
relation to recent literature in the field of science and mathematics education
highlighting the contributions that the Spades study may make to the field. I then
further discuss the findings from the syncretic analysis designed to contextualize the
resources of the players. Central to this analysis is Spades as an empowering practice
for the players. Before concluding the chapter with some final thoughts, I highlight
the limitations of the study and possible avenues for further research.

**Modeling and African American Students**

Much like scientists using representational models of natural phenomena to
predict future outcomes, the study found that the players consider multiple variables
and factors, as well as their mathematical relationships, to predict future occurrences
and then play cards accordingly. Central to this process is making observations of
cards played, drawing inferences about what other players are holding, and making
predictions about what cards other players may play. Using an ethic of conservation
as a schema or an unwritten norm, the players conduct cost-benefit analyses when
weighing their options, assess the risks involved in playing cards or using particular
strategies (e.g., going blind), and use probabilistic reasoning as part of their decision-
making processes. These findings strongly suggest that the Spades players learn and
develop significant resources, through an everyday, cultural practice, that are relevant
to science. For instance, making observations, drawing inferences, and making predictions are actions long considered central in science. Further, modeling and model-based reasoning are central to both science (Clement & Rea-Ramirez, 2008; Lehrer & Schauble, 2000; Nersessian, 2005; Windschitl & Thompson, 2006) and mathematics (Lesh & Doerr, 2003).

A significant finding then is that the players have developed conceptual models to make sense of complex situations. The analysis highlights interesting connections between the player models and reasoning and the practice of scientific modeling. For instance, conceptual models from any given field of science that attempt to represent and make sense of complex systems or phenomena (e.g., the water cycle, global warming models, lake eutrophication models, etc.) deal with multiple variables in a system and their relationships, often described in mathematical terms (i.e., direct and inverse relationships). Such reasoning is also germane to playing Spades, as the players consider multiple variables and their relationships when making decisions. Further, modelers always deal with high degrees of uncertainty, as the systems being modeled are often complex and the data collected are often incomplete. Scientists call these fuzzy models (Jorgensen & Bendoricchio, 2001), as the observations and data only allow for scientists to predict outcomes in terms of ranges and likelihoods (i.e., low, medium, or high). Spades players use similar forms of reasoning, as they make decisions based upon seeing only a small part of a larger picture: their own hand and any cards played by their teammate and opponents. They use such observations, along with knowledge of probability, to
make predictions and play cards accordingly. In doing so, the players are operating with uncertainty, incomplete data sets, and ranges of likelihoods that future cards played will result in certain occurrences. Indeed, the players have developed fuzzy models. Lastly, all modeling uses conditional probability: the likelihood of any future occurrence is dependent upon specific conditions and inputs (Gnedenko & Khinchin, 1961). Again, the Spades players are highly skilled at assessing situations, estimating the likelihood of future occurrences based upon their observations, and making decisions accordingly.

In all of these ways then, the resources that Spades players have learned and developed relate in significant ways to modeling, a central practice in both science and mathematics. Increasing the importance of these findings is the research that suggests that many teachers tend to hold deficit views of African American young men, views that contribute in part to their lack of success in these subjects (Fergusson, 2003; Neal, McCray, Webb-Johnson, & Bridgest, 2003; Noguera, 2003; Spencer, 1986; Steele & Aronson, 1998; Swanson, Cunningham, & Spencer, 2003; Weinstein, Madison, & Kuklinski, 1995). The Spades study therefore challenges many of the assumptions that underlie such deficit views, as it was found that the players bring to classrooms resources that should position them for success in both science and mathematics. Later in this discussion, I explore the implications for the Spades study in challenging deficit views in relation to the achievement gap.

**Pedagogical Implications.** The connections between player models and scientific modeling have pedagogical implications as well. Lesh, Cramer, Doerr,
Post, and Zawojewski (2003) hold that developing models grounded in everyday experience is the first stage in appropriating the resources necessary for the continued development of scientific and mathematical modeling and model based reasoning. In order to facilitate student learning, Lesh et al. (2003) involve students in a model eliciting, exploration, and adaptation sequence. Beginning with model-eliciting activities grounded in everyday experience, the students are then challenged to explore assumptions made in their initial models during the model exploration phase. During the adaptation phase, students use models to solve more complex problems. Lesh et al’s (2003) model developing sequence is based upon the idea that once an individual has made sense of one complex situation, such experience provides them with the resources needed to make sense of other systems. Collins and Gentner (1987) call this analogous reasoning, which is considered foundational for modeling. Operating from a base (i.e., a known system), modelers use analogous reasoning to make connections between the base and a target system: some other system that one wishes to better understand (Collins & Gentner, 1987).

As the Spades players have developed models that guide their decision-making in the game, it follows then that the Spades players’ could use their resources learned through playing the game to both develop other models and to make sense of target systems. In the case of the Spades players, complex environmental and ecological systems, such as those that represent global climate patterns or freshwater ecosystems, bear similarities to the models developed by the Spades players: they are dynamic and deal with multiple variables as well as their mathematical relationships.
In fact, one of the first environmental models developed, the Streeter-Phelps model (Streeter & Phelps, 1925), was designed to calculate the amount of dissolved oxygen downstream from a wastewater discharge. The model considers such variables as the biological oxygen demand of both the river water and of the discharge water, the flow of the river upstream of the discharge, and the flow of water from the discharge. As such systems deal with multiple variables and their relationships, they are likely target systems which Spades players could be successful in making sense of, given scaffolded instruction.

Spades and model development. Similar to Lesh et al’s (2003) model developing sequence described above, Lehrer and Schauble’s (2003) typology of models presented in Chapter Two (i.e., physical, representational, syntactic, hypothetical-deductive models) takes a developmental view of modeling. As we move from physical models through the continuum, the models increase in their levels of abstraction, bearing less and less resemblance to the target systems that they are designed to represent. In the Spades study, it was found that the players’ models fall in the category of representational models. Consequently, the players have already developed models that place them well past the initial stages, positioning them to move to further levels of abstraction in modeling.

Recall from Chapter Two that Lesh and Doerr (2003) found that the African American students they worked with excelled in their model development by operating at high levels of cognition and engagement in the activities. Significantly, these were students placed by the school in remedial mathematics classes. The
researchers reported that the students were “capable of inventing (or significantly modifying, refining, or adapting) powerful mathematical or scientific constructs that are much more sophisticated than anybody had dared teach them” (Lesh & Doerr, 2003, p. 23). The students were able to move beyond their initial conceptions of situations and develop models to gain understandings of complexity. Importantly, the students displayed forms of cognition that moved far beyond what would have been expected of them in a traditional, textbook-centered science or mathematics classroom.

As the Spades players use models well past initial the initial stages of model development, it follows then that the players could likely excel in model-eliciting activities much like the students in Lesh and Doerr’s (2003) study. Further, as was found by the diachronic analysis, the cognition displayed by the Spades players is part of the repertoires of practice of African Americans developed over the past 150 years by engaging in practices like Bid Whist and Spades. Since these games are common in African American communities throughout the nation, the repertoires of practice that position African American youth as abstract thinkers who can reason about complexity are likely common across age, gender and class in African American communities. Many African Americans, by engaging in cultural practices like Spades, have developed complex representational models with high levels of abstraction that employ advanced forms of cognition. It is likely then that many African American students come to science and mathematics classrooms with resources that position them to excel in scientific and mathematical practices like
modeling that are central to these disciplines. It should come as no surprise then that the students referred to by Lesh and Doerr (2003) could excel in a model development sequence.

For educators interested in issues of equity in science education, the question becomes then why are so many African American students performing so much lower than their White peers, when many come to our classrooms with resources that should predispose them for success? Gaining insight into this question, the Spades study focuses our attention upon a likely contributing factor to the lack of success of African American students in science and mathematics classrooms: the negative and stereotypical views (Neal et al., 2003; Spencer, 1986), as well as the low expectations (Fergusson, 2003; Noguera, 2003) that many teachers tend to hold of African American young men. The findings of the Spades study strongly question traditional and persistent deficit-based views of African American young men and support a move away from such views. They do so by documenting the numerous and robust resources players learn and develop through Spades. Importantly, their resources suggest strong connections to science and mathematics. Consequently, many of these young men enter science and mathematics with resources that predispose them for success in these subjects, not failure. An asset-based view of these young men, if appropriated by teachers, could help to improve educational contexts for these young
men by helping to build more supportive student-teacher relationships based upon assets and success, rather than deficits and failure\(^{13}\).

However, the Spades study also helps to question deficit views of African American communities as well. It does so by employing the cultural-historical lens that situates the cognition learned through the game in the repertoires of practice of the African American Spades playing community. The findings from this perspective help us to project asset-based views of individual players onto their communities. The evidence presented in this study demonstrates that the cultural practice of card playing for African Americans extends back 150 years, has been passed on from generation to generation, and has resulted in the learning and development of significant forms of reasoning. The study therefore points to just one of many cultural practices taking place in African American communities through which youth acquire resources that can support disciplinary forms of learning in school-based settings. The argument here is not meant to romanticize urban African American communities or to ignore many of the hardships that working class and low SES African Americans face. However, the Spades study adds to our knowledge of the assets in African American communities that have long been ignored or overshadowed by a focus upon negatives and deficits. The models used in Spades

\(^{13}\) Research has revealed differences in how teachers interact with high and low achieving students (see Cooper, 1979; Good, 1987; Skinner and Belmont, 1993). In short, differential teacher behaviors between high and low achieving students has been shown to reinforce and maintain student performance levels as well as student levels of engagement in classroom activity. For research specific to teacher expectations and African American students, see Gross (1993) for a study of the effects of teacher expectations upon student attitudes towards an advanced mathematics class. Also, see Fergusson (2003) for an analysis of the interaction between teacher expectations and African American student performance.
play are some of those assets that the Spades players have developed through this common, cultural practice.

_Spades as an Empowering Context for African American Young Men_

The Spades study identified eight features central to Spades. In short, Spades is an enjoyable, social, dynamic, intellectually challenging, and empowering cultural practice that involves risk-taking, competition and cooperation. Further, the expert players occupy positions within this peer-based community of practice from which they exercise acts of power that often involve changing the practice itself. Spades is therefore an empowering practice for the players, as they use their resources to both win games and decide the future directions that the practice takes. Taken together, these features form a context for the learning and development of the significant forms of cognition related to science and mathematics. The contextual analysis therefore provides insights into a practice to which African American young men willingly dedicate time, effort and resources in order to become the best at something. Consequently, gaining insight into this highly motivating practice may provide insights into why science and mathematics classrooms have not been so for these young men for the most part.

A salient feature of Spades is that it is an empowering context for these players. So what makes New School Spades at Biddie Mason such an empowering context? To answer this question, we can look across three contexts inhabited by the Spades players: their homes, their classrooms, and the cafeteria and common areas at Biddie Mason. Many of the players grew up in homes in which Spades is regularly
played. In the home, the adults occupy the positions of power: they determine the rules of the game and who sits at the table. Likewise, as the players come to school, they attend classes in which teachers manage the classroom, dictate the rules, and decide the focus for activity. However, in the cafeteria and the common area at Biddie Mason, the players run the show: no caregivers or teachers are present, just lunch monitors. The expert Spades players have filled this vacuum of power by importing a culturally valued practice into this space.

Following Sewell (1992), the players invoke their resources in Spades thus exercising acts of power in order to accumulate more resources (e.g., partners, respect, status) and maintain positions from which they can continue to exercise such acts. Importantly, Spades is not only a rich context that fosters the learning and development of resources, it is also porous to the transposition of resources learned in other settings like “trash talking” and other creative uses of language. Herein lies the link between acts of power and agency, a central feature of Sewell’s (1982) reconceptualization of Giddens’ (1981) theory of structure. As the reader may recall, Sewell defines agency as acts that occur when an individual brings schemas and resources learned in one context to bear upon another. Agency is a salient feature of Sewell’s theory for two reasons. First, it accounts for social change in practice, as new resources and schemas brought into a practice can bring about change. Second, it positions humans as active agents of change, rather than as cultural robots thus alleviating us from traditional Marxist determinism.
The Spades players, by changing the practice of New School Spades, are acting as empowered agents of change. One of the significant resources the players bring to bear then is the ability to alter a practice to achieve specific goals or purposes: to gain a competitive edge over opponents and to maintain the novelty of an activity. Such changes not only ensure one’s status in a community, but also preserve the practice itself, as without such innovations, the activity would become static, routine and no longer enjoyable. Consequently, maintaining status in this peer-based community does not equate to stasis in the practice of Spades. Quite the opposite has occurred at Biddie Mason, as New School Spades is a dynamic practice. In this setting, the players control the dynamic nature of the practice by changing the structure of the game.

Given the empowering context of Spades in which the players can display their resources as well as exercise acts of agency, it should come as no surprise that this peer-based community has thrived in the cafeteria and common area of Biddie Mason for some time. The community, built around a practice with cultural and historical significance, provides a space outside of the players’ homes and classrooms where they can feel empowered. From this perspective, the Spades study supports science and mathematics classroom pedagogies that draw upon the schemas and resources of African American young men in order to increase their feelings of empowerment. I turn to an exploration of some examples of such pedagogies next.

*Creating Empowering Contexts in Science and Mathematics Classrooms*
The findings of the Spades study thus lead us to consider how we might alter practices in science and mathematics classrooms to create more inviting contexts for African American young men. Drawing from the analysis of resources, power and agency, empowering contexts for African American young men must be open to the transposition of resources that they bring to an activity or practice. Unfortunately, content-centered, transmission pedagogies have been pervasive in science and mathematics classrooms. Such classrooms tend to support very narrow forms of cognition, participation, and assessment. On the other hand, the findings of the Spades study support the use of a variety of pedagogies designed to draw upon the resources of students from non-dominant groups that relate directly to science and mathematics (Ares, Stroup, & Schademan, forthcoming; Elmesky, 2005; Hudicourt-Barnes, 2003; Lee, 2006; Roseberry, Warren, & Conant, 1992; Seiler, 2001).

Specifically, what the Spades study contributes to this literature is two-fold: 1) a focus upon modeling in cultural practice and 2) the use of modeling in classroom practice designed to draw upon the resources of African American young men that relate directly to this central practice of science and mathematics.

Consequently, the Spades study supports the use of Lesh and Doerr’s (2003) model development sequence as well as student-teacher co-construction of models highlighted by Rea-Ramirez et al. (2008). Both of these pedagogies ground model development in everyday experience, ask open-ended questions without single clear answers, and draw upon student prior knowledge and experience in significant ways. In essence, these approaches have the potential of being porous to the resources
related to modeling that African American young men have learned and developed through cultural practice. Further, they each place students in positions from which they can make decisions about how a model is constructed, and the resources that they can bring to bear upon such constructions. Consequently, model-eliciting activities can create empowering contexts as they encourage acts of agency in the transposition of rich resources learned through cultural practice into the classroom.

The Spades study may contribute to research on modeling in classrooms that attempts to understand how models are co-constructed in science classrooms by teachers and students (Rea-Ramirez, Clement, & Nunez-Oviedo, 2008). The researchers attempt to place the cognition of students in science within the context of classroom social interactions by creating a community of learners (Brown & Campione, 1993) around the co-construction of explanatory models: inventions based upon empirical data that attempt to describe unobservable processes that account for observable changes in the variables of a system (Rea-Ramirez et al., 2008). The research, still in its early phases, is attempting to understand the contextual features of classrooms that support forms of cognition involved in modeling (e.g., analogous reasoning). My study could inform such research by attending to the contextual features of Spades that foster the model development of African American young men. For example the contextual features of empowerment discussed previously, as well as the equalization of risk of Spades for African American young men explored below could help inform this line of research. By purposely considering such features in classrooms, as well as by drawing upon the specific resources identified in this
study as a foundation for model development, science teachers involved in modeling activities could positively impact student learning for African American young men. The findings of the Spades study concerning the context of the game could be especially helpful to teachers using model development activities in urban classrooms that serve African American students.

*Risk and equitable classrooms.* One contextual feature of New School Spades requiring further discussion is that of risk, as it is central to the game and relates in significant ways to creating equitable classrooms (Rex & McEachen, 1999). An important aspect of risk in Spades is that all players are somewhat equally at risk throughout a hand or a game, as the positions of the game consistently change. For instance, a player in last position may take an opponent’s little joker with the big joker, but then must play lead in the following book, a position incumbent with much higher levels of risk and uncertainty. Risk is therefore somewhat evenly distributed in Spades, as all players in all games are placed in positions incumbent with varying levels of risk. One player’s comment about risk sums up the idea of the equal distribution of risk: “sooner or later your gonna have to put your ass on the table, and when you do, I’m gonna be behind you.”

The feature of equalizing risk has some important pedagogical implications for the creation of equitable classroom practices and cultures that legitimatize student resources. In their work conducting discourse analyses in inclusive classrooms, Rex and McEachen (1999) found that a necessary condition for the creation of equitable discourse in classrooms is the positioning of all participants to assume equal risks for
their contributions. Such a view recognizes that risk is inherent in social situations, so instead of trying to create risk free environments, practitioners work towards equalizing risk. Rex (2008) holds that such positioning helps to maintain a “social equilibrium” in which students have the freedom and power to establish positive identities.

Equalizing risk then helps to create an empowering context in which students can introduce their resources into a classroom discourse. In this way, equalizing risk increases the likelihood that students will commit acts of agency by introducing their resources into classrooms. The Spades players use a host of cultural resources in Spades. Part of the reason for this may be that levels of risk are equally distributed across the players. The Spades study therefore underscores this important work that focuses upon how risk, as a contextual feature of any practice, influences the legitimization and marginalization of resources. In so doing, risk, and how it is either imbalanced or equalized in a classroom, is connected to issues of power.

Further Implications

The Spades study increases our knowledge of the everyday scientific and mathematical practices learned and developed through engaging in cultural practices by situating such learning and resources within the repertoires of practice of African American young men who attend school in the United States. Many studies done on everyday forms of cognition have been conducted either abroad (Carraher, 1985; Nunez, Schliemann, & Carraher; Saxe, 1988) or upon adults who are no longer in school (Lave, 1988; Masingila, 1994; Schliemann, 1984). The findings from these
studies are invaluable in that they have provided important insights into significant forms of cognition learned through everyday practices. The Spades study builds upon this important line of research by helping educators in the United States gain insight into the valuable forms of cognition possessed by African American young men, who tend to perform poorly in science and mathematics. Along with the work of Nasir (2000, 2002, 2005), the Spades study could help to fill a gap left by previous studies in everyday practice and cognition. It does so by providing educators with tangible forms of cognition and reasoning of African American young men that could be leveraged in the service of disciplinary forms of learning in school-based contexts.

The Spades study also provides educators with ideas on how to promote learning and development of rich forms of knowledge in out-of-school contexts. As we have known for some time, and the Spades study reinforces, many significant forms of learning take place in out-of-school contexts. Examples are abundant in the literature of learning taking place through cultural practice (see citations above), but research also supports the effectiveness of after-school programs, like Cole’s (1996) Fifth Dimension Project, Seiler’s (2001) science lunch club, and Elmesky and Tobin’s (2005) research on student researchers. The Spades study could support the formation of after-school programs around significant cultural practices without colonizing such practices, as would happen if trying simply to transpose such practices into a classroom setting. This could be prevented in an after-school program, as the activity could be focused around a cultural practice, and not in the service of disciplinary forms of learning. Such programs might provide opportunities
to foster school-community connections through engagement in valued cultural-historical practices. They would also provide ways for students who do not participate in traditional school-based activities (i.e., sports, music, yearbook, etc.) to get involved in activities that nurture not only their cognitive development, but also connections to other youth with similar interests.

Finally, the Spades study may help researchers in science education expand the kinds of cognition that they consider and examine in modeling and model-based reasoning to include more research on representational models of complex, environmental and ecological systems. For the most part, this kind of science is fertile ground for making concrete connections to cognition in everyday practice. The current research on modeling in classroom settings has focused upon mathematics (Lesh & Doerr, 2003), physics (Clement & Steinberg, 2008; Steinberg, 2008), human biological systems (Rea-Ramirez, 2008; Nunez-Oviedo, Clement, & Rea-Ramirez, 2008), and chemistry (Khan, 2008). Little to no research has taken place on how students may construct and develop models that focus upon ecological and environmental systems. Given the ecological and environmental problems like global climate change that humans now face, a focus on such systems and their models is both timely and needed in order to increase student understanding of these complex systems and the role that humans play in affecting them.

**Limitations of the Study**

Although Spades is a common practice in African American communities, not all people in such communities play Spades. Only a certain percentage of African
Americans play Spades, thus decreasing the generalizability of the findings. This also places limitations upon how we might translate the findings of the study into practice. Even if a science or mathematics teacher would appropriate the knowledge of player resources, how would he or she use this information in a classroom in which only a certain percentage of the students have such resources? However, drawing on these specific resources may situate African American young men in the classroom as authorities thus empowering them in a context that has historically marginalized them. Valuing the knowledge that African American young men bring to a classroom could position them, in relation to their peers, as producers of knowledge in science and mathematics classrooms.

Further, a huge gap remains between identifying resources of African American young men and the context in which they have developed, and implementing, especially in any kind of systemic way, pedagogical interventions that might improve the plight of African American young men in the public school system. As highlighted previously, importing any cultural practice into a school setting for the purpose of disciplinary forms of learning could be considered an act of colonization and further exacerbate the already poor relations between many African American students and their teachers. Transporting practices into classrooms removes practices from the social relations and cultural contexts in which they arose and through which community members attribute value to them. The school would then determine the worth of a practice in terms of meeting both institutionally defined curricular goals and purposes of schooling. Consequently, student identities that have
developed in relation to a cultural practice like Spades would become separated from the practice itself, leaving the players marginalized from the very activity that has affected their learning and development. It seems then that appropriating asset-based views of these young men as well as incorporating some of the contextual features of Spades may be the most fruitful ways of improving educational contexts for African American young men in relation to the findings of the Spades study.

Also, researching the cognition of the players was problematic given the tacit nature of both their thinking and use of strategies. Many of the players who served as participants in the study have been playing the game for some time, some as many as ten years. Many of their decision-making processes have become highly operationalized, making it difficult for the players to put their thinking into words. Further, my failure to involve the Spades players more centrally in the analysis somewhat decreased the trustworthiness of the findings. As a researcher, I had to strike a balance between gaining trustworthy findings and respecting the time and preferences of the Spades players. The players were mostly interested in playing the game, and although wanted to be part of the “book” (as they called my study), they were not amenable to talking extensively about their cognition or my requests for member checking. Although I consider the findings of the study to be trustworthy, more input from the players may have resulted in a more nuanced portrayal of the player resources and forms of cognition.

As mostly African American young men played Spades at Biddie Mason, the study is lacking in an analysis of the resources of African American young women.
To simply generalize the findings to African American young women would not be wise, as their approach to the game, and therefore the resources that they learn and develop through the practice, may be different in significant ways than those of the young men. Although African American young women have made more significant gains in science and mathematics that their male counterparts (See Chapter Two, first section), they still are currently underserved by our schools in these subject areas and therefore warrant more attention than this study gave them.

Further, another limitation of this study was a lack of understanding of the player’s experiences in science and mathematics classrooms. I collected no data on their grades or performance in these subjects, or their views of their experiences in these classes. As a result, I could not draw direct conclusions that speak to how the players’ resources learned through Spades were being drawn upon by their science and mathematics teachers. As all studies need to be bounded to some extent based upon time and resources available, I chose instead to focus on understanding the practice of Spades, which I found to be an overwhelming task in itself.

Finally, I did not play enough of a transformative role in the lives of the individual Spades players. Instead, I approached the study from an interpretivist research paradigm (Lincoln & Guba, 2000) with the intent that the research findings may someday improve science and mathematics education for African American young men in general. I could have spent more time trying to help the players better understand the significance of their resources learned through Spades, or organized an after-school Spades playing club, or offered help to the seniors in filling out
applications for college. I end this study then with a feeling that I did not do enough to change the lives of the people who made the study possible.

Possibilities for Future Research

Outside of Lesh and Doer’s (2003) study, little research has been conducted upon African American students and modeling in classrooms, or in any context for that matter. The Spades study encourages us to conduct interventions, in classrooms or in out-of-school settings, designed to examine the kinds of resources that students bring to open-ended, model-based activities in science and mathematics. Such research could be invaluable by encouraging science and mathematics teachers to appropriate non-deficit views of African American students and to use model-based activities which open classrooms to the transposition of student resources. A part of such studies should be to focus upon, from a phenomenological perspective, the experience of African American students in these settings. The main question here would concern issues of power and empowerment by comparing student views of their experience in these settings compared to their experiences in more traditional science and mathematics classrooms. Such findings may provide insights into the fruitfulness of this pedagogical approach; especially how effective it might be in mitigating the unequal power relations at work in classrooms that result in the marginalization of resources of students from non-dominant groups.

In addition, more ethnographic research is needed to understand the many productive and constructive cultural practices taking place historically in African American communities. Nasir’s (2000, 2001, 2005) work on basketball and
dominoes, Lee’s Cultural Modeling Project (2006), along with the Spades study have provided a sound research base of cultural practices and resources of African American students. However, more research is needed on practices that relate in significant ways to disciplinary forms of learning. For instance, no work to my knowledge has been done in relation to social studies. Given the experiences that many urban African American youth have with racism, poverty, and violence, it seems that researchers and teachers in social studies education could draw upon this knowledge in significant ways to promote learning in these classrooms.

Another way to extend the study would be to survey players’ academic records to quantify their academic performances in science and mathematics classes. The focus of the study would be to determine how well expert Spades players perform in these classes and gain insight into the reasons why or why not. The study could involve interviews with both the players and their teachers to gain further insight into the reasons for their academic performance and whether or not Spades plays a role.

More research is needed on after-school programs that support cultural practices like Spades. Due to the popularity of practices like Spades, such programs may be successful in creating school community connections by showing that the school is aware and interested in the popular cultural practices taking place in the community. It could also have a legitimatizing effect on such practices, as teachers in the school would begin to recognize and value them as well.
Finally, another way to extend the study would be to work with the players in a more transformative way than was done in this study. The research could focus on sharing findings with the players in order to help them see the significant things that they are doing and learning through the game, things that the players take for granted given their tacit nature. Such work may have a positive effect on the players’ views of their abilities in relation to science and mathematics.

**Conclusion**

I wish to make it clear that I am not proposing that an implication of the study is that science and mathematics teachers use Spades directly in classrooms as a pedagogical tool. Acts of agency, according to Sewell (1992), occur in the transposition of cultural schemas and resources from one practice to another. It is important to notice that it is not the practice being transposed, but the schemas and resources. On the other hand, an implication of the study supported by Sewell’s theory of resources and agency is that the cultural schemas and resources of African American young men could be transposed into science and mathematics classrooms.

To this end, in this study I attempted to make explicit the cognition of African American young men, as it is situated within the context of a cultural practice. If we adopt Cole’s (1986) definition of context as “that which weaves together” (p. 134), rather than “that which surrounds” (p. 132), it then becomes very difficult to separate the cognition from the practice. They are intimately intertwined. Herein then lies the main significance of the study: that Spades exists and that through the practice, significant forms of cognition have arisen and are engaged in willingly by many
African American youth and adults across the country. Rather than attempt to co-opt the practice, we can simply value it for what it is, as well as the resources that many youth have learned through the practice. Using this knowledge, educators can then look upon African American students, as well as their communities, in a more positive light. Such a move gives teachers and students something tangible from which to form constructive, supportive, and productive relationships based upon mutual respect that promote learning. Such asset based views of students, and the supportive relationships that they foster, can be combined with pedagogies that open up the classroom to multiple forms of cognition and promote the co-construction of scientific and mathematical knowledge. Such classrooms could mitigate the imbalanced power relations in classrooms that have historically resulted in the culture of power that has contributed to the marginalization of so many African American students in our schools, thus helping to improve educational contexts by promoting equitable classroom practices.

Finally, my hope with this study is that people no longer simply glance at African American young men playing Spades and think that they are wasting their time or gambling. Spades is an amazing game that is worthy of respect, and so are its players. Spades is no mere past time: it is a complex game that requires amazing intellectual abilities. Most importantly, it is a cultural practice that has developed over the past 150 years through which African American young men display their incredible talents.
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